

# Service Manual

 **PIONEER®**  
The Art of Entertainment

ORDER NO.  
ARP2796

MULTI-PROJECTION UNIT

**RMA-V2130** VUW

SCREEN (LENTICULAR)

**RMA-V2140** WL

SCREEN (FRESNEL)

**RMA-V2150** WL

- Refer to the service manual ARP2198 for RM – V2000/VU/CA.
- This manual is applicable to the following : RMA – V2130/VUW ; RMA – V2140/WL ; RMA – V2150/WL

# MA-V2130, RMA-V2140, RMA-V2150

## 1. RMA-V2130

### NOTES :

- Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
- The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "☉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

### ■ CONTRAST OF MISCELLANEOUS PARTS

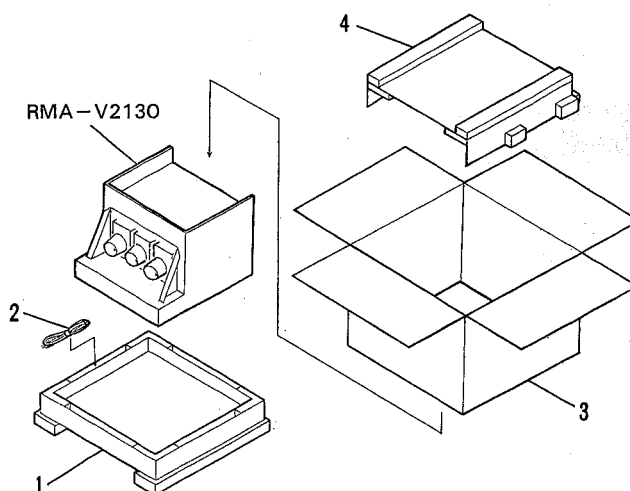
RMA-V2130 and Block assembly (BWU1004) of RM-V2000 have the same construction except for the following :

Mark	Symbol & Description	Part No.		Remarks
		BWU1004	RMA-V2130	
	ABL cable	.....	BDF1007	For accessories
	Upper carton	BHD1131	BHD1201	

### ■ PACKING

#### Parts List

Mark	No.	Description	Parts No.
	1	UNDER CARTON	BHD1132
	2	ABL CABLE	BDF1007
	3	UPPER CARTON	BHD1201
	4	UPPER PAD	BHA1026



## 2. RMA-V2140 AND RMA-V2150

### NOTES :

- Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
- The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "☉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

### 2.1 RMA-V2140

Mark	No.	Description	Parts No.
NSP		LENTICULAR SHEET	BMR1028

#### Note :

Although BMR1028, BMR1013 and BMR1016 of RM-V2000 are different in part number, they are interchangeable with each other because the specifications are the same.

(In the service manual ARP2198, the part number of the LENTICULAR SHEET is BMR1013. The part number has been changed from BMR1013 to BMR1016.)

### 2.2 RMA-V2150

Mark	No.	Description	Parts No.
NSP		FRESNEL LENS	BMR1029

#### Note :

Although BMR1029 and BMR1012 of RM-V2000 are different in part number, they are interchangeable each other because of the same specifications.

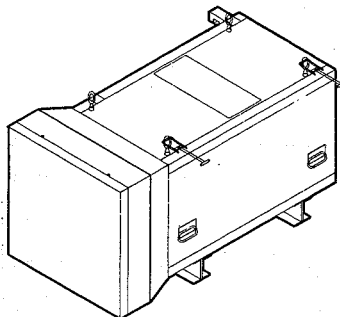


1383

**PIONEER®**  
The Art of Entertainment

3291

# Service Manual



ORDER NO.  
ARP2198

40" TYPE PROJECTION UNIT

# RM-V2000

- This service manual is applicable to the RM-V2000/VU/CA type.

## CONTENTS

1. SAFETY INFORMATION .....	3	8. ADJUSTMENTS .....	78
2. PRODUCT SAFETY NOTICE .....	4	9. REPLACING THE CRT ASSEMBLY .....	104
3. CHARGED SECTION, HIGH VOLTAGE GENERATING POINT AND X-RAY PROTECTION .....	5	10. BLOCK DIAGRAM .....	108
4. HOW TO CLEAN .....	7	11. IC INFORMATION .....	109
5. EXPLODED VIEWS, PACKING AND PARTS LIST .....	8	12. TROUBLE SHOOTING .....	111
6. SCHEMATIC DIAGRAMS AND P.C.BOARD PATTERNS .....	21	13. CIRCUIT DESCRIPTION .....	115
7. PCB 's PARTS LIST .....	66	14. SPECIFICATIONS .....	117
		15. HANDLING PRECAUTIONS .....	118
		16. BEFORE OPERATING THIS UNIT .....	119
		17. NAMES AND FUNCTIONS OF PARTS .....	120
		18. REAR PANEL MODE SELECTOR .....	121

**PIONEER ELECTRONIC CORPORATION** 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan  
**PIONEER ELECTRONICS SERVICE INC.** P.O. Box 1760, Long Beach, California 90801 U.S.A.  
**PIONEER ELECTRONICS OF CANADA, INC.** 505 Cochrane Drive, Markham, Ontario L3R 8E3 Canada  
**PIONEER ELECTRONIC [EUROPE] N.V.** Keetberglaan 1, 2740 Beveren, Belgium  
**PIONEER ELECTRONICS AUSTRALIA PTY. LTD.** 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL: [03] 580-9911  
 © PIONEER ELECTRONIC CORPORATION 1991

YP MAY 1991 Printed in Japan

3291

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.

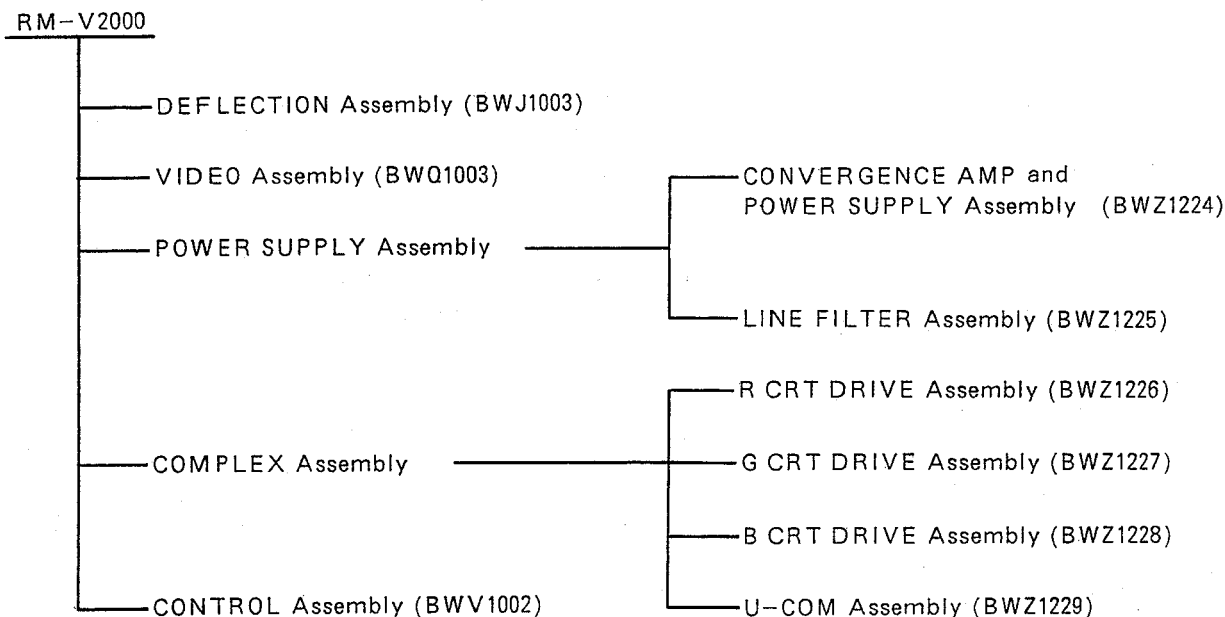
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

## WARNING

Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5).

When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin-contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

## • ASSEMBLIES LIST



# 1. SAFETY INFORMATION

**NOTICE:** Comply with all cautions and safety related notes located on or inside the cabinet and on the chassis or picture tube.

The following precautions should be observed:

1. Do not install, remove, or handle the picture tube in any manner unless shatterproof goggles are worn. People not so equipped should be kept away while picture tubes are handled. Keep picture tube away from the body while handling.
2. When service is required, even though the RM-V2000 an isolation transformer should be inserted between power line and the set in safety before any service is performed.
3. When replacing a chassis in the set, all the protective devices must be put back in place, such as barriers, nonmetallic knobs, adjustment and compartment covershields, isolation resistor-capacitor, etc.
4. When service is required, observe the original lead dress.

Extra precaution should be taken to assure correct lead dress in the high voltage circuitry area.

5. Always use the manufacturer's replacement components.

Especially critical components as indicated on the circuit diagram should not be replaced by other manufacture's.

Furthermore where a short circuit has occurred, replace those components that indicate evidence of overheating.

6. Before returning a serviced set to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the set by the manufacturer has become defective, or inadvertently defeated during servicing.

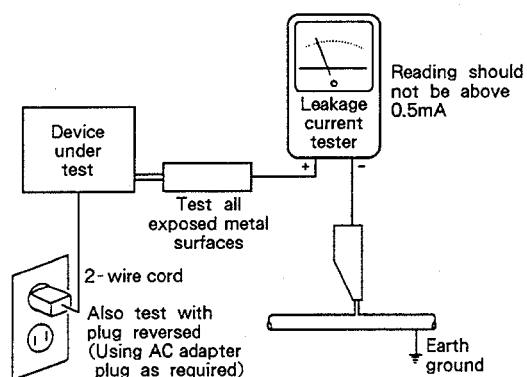
Therefore, the following checks should be performed for the continued protection of the customer and service technician.

## Leakage Current Cold Check

With the AC plug removed from the 120V AC 60Hz source, place a jumper across the two plug prongs. Turn the AC power switch on. Using an insulation tester (DC 500V), connect one lead to the jumpered AC plug and touch the other lead to each exposed metal part (input/output terminals, screwheads, metal overlays, control shafts, etc.), particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistor reading of  $0.3M\Omega$  and a maximum resistor reading of  $5M\Omega$ . Any resistor value below or above this range indicates an abnormality which requires corrective action. Exposed metal parts not having a return path to the chassis will indicate an open circuit.

## Leakage Current Hot Check

Plug the AC line cord directly into a 120V AC 60Hz outlet (do not use an isolation transformer for this check). Turn the AC power switch on. Using a "Leakage Current Tester (Simpson Model 229 equivalent)", measure for current from all exposed metal parts of the cabinet (input/output terminals, screwheads, metal overlays, control shaft, etc.), particularly any exposed metal part having a return path to the chassis, to a known earth ground (water pipe, conduit, etc.). Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE SET TO THE CUSTOMER.

## 2. PRODUCT SAFETY NOTICE

### High Voltage

This set is provided with a X-ray protection for clearly indicating that voltage has increased in excess of a predetermined value. Comply with all notes described in this Service Manual regarding this hold down circuit when servicing, so that this X-ray protection may correctly be operated.

### Serviceman Warning

In the status of the black picture (video muting is being applied) when no signal is input, high voltage of this set during operation is less than 31.0kV. In case any component having some relation to the high voltage is replaced, confirm that the high voltage is lower than 31.0kV in the status of the black picture when no signal is input.

### X-radiation

**TUBE :** The primary source of X-radiation in this set is the picture tube.

For continued X-radiation protection, the replacement tube must be the same type as the original, PIONEER approved type.

The picture tube (CRT assembly R, G, B) used in this set holds complete guarantee against X-ray radiation when the X-ray is sealed (See on page 6). Accordingly, when the current in flowing to the picture tube (CRT assembly R, G, B), be sure to perform it by putting the tube into X-ray sealed applied state. Avoid absolutely to flow the current to the picture tube (CRT assembly R, G, B) itself. Moreover, when the voltage of the high voltage circuit becomes abnormally a little higher, the picture tube radiates X-rays. Accordingly, when servicing the high voltage circuit be sure to replace as an assembly with the DEFLECTION assembly (BWJ1003) in the manner in which has been adjusted to perform normal operation.

Many electrical and mechanical parts in PIONEER set have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a  $\Delta$  on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, X-radiation, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

### 3. CHARGED SECTION, HIGH VOLTAGE GENERATING POINT AND X-RAY PROTECTION

#### ■ Charged section

The circuit in which the commercial AC power is used as it is without passing through the power supply transformer. If the charged section is touched, there is a risk of electric shock. In addition, the measuring equipment can be damaged if it is connected to the GND of the charged section and the GND of the non-charged section while connecting the set directly to the commercial AC power supply. In this case, be sure to connect the set via an insulated transformer and supply the current.

#### ■ Charged section (Power supply primary side)

1. The primary side of the POWER SUPPLY assembly  
BWZ1224 and BWZ1225
2. AC power cord  
ADG1088
3. AC outlet (1P)  
AKP1079
4. Power transformer  
ATS1326
5. Voltage selector  
AKX1004

▨ part is the charged section.  
▩ part is the high voltage generating points other than the charged section.

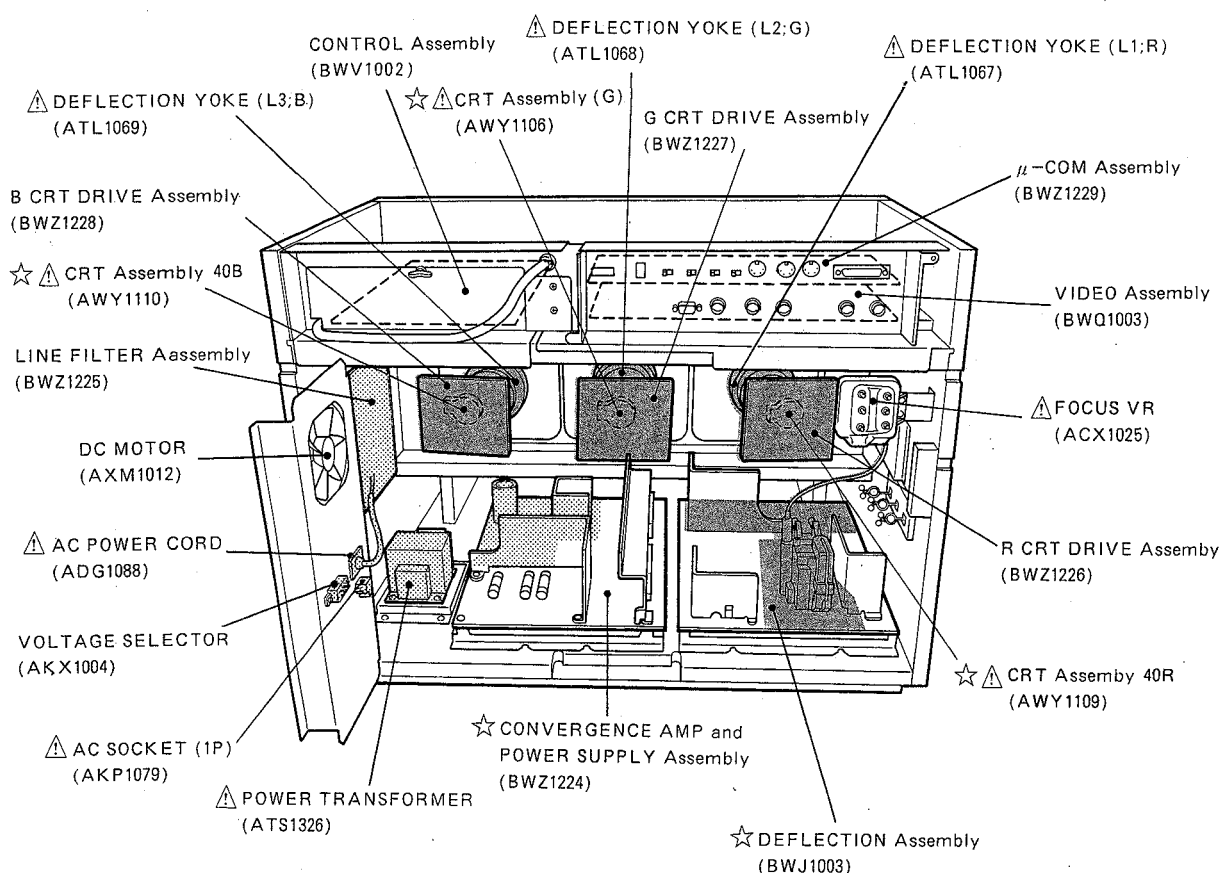


Fig. 3-1 Charged section and high voltage generating point

## ■ High voltage generating point

The place where voltage of over 100V is generated.

1. Charged section
2. DEFLECTION assembly (including FBT)  
BWJ1003 (31.0kV, 135V)
3. R CRT DRIVE assembly  
BWZ1226 (10.5kV)
4. G CRT DRIVE assembly  
BWZ1227 (10.5kV)
5. B CRT DRIVE assembly  
BWZ1228 (10.5kV)
6. CRT assembly 40 R  
AWY1109 (31.0kV)
7. CRT assembly (G)  
AWY1106 (31.0kV)
8. CRT assembly 40 B  
AWY1110 (31.0kV)
9. Focus variable resistor (VR1)  
ACX1025 (10.5kV)
10. Deflection yoke  
ATL1061 (L1 : R)  
ATL1062 (L2 : G) (Approx. 1100V at peak)  
ATL1063 (L3 : B)

## ■ X-ray protection

- Regarding the parts which are relative to radiation of X-rays (There is the danger to radiate X-ray from the individual CRT assembly R, G, B), there are notifications of caution in the individual schematic diagrams. Be sure to read them for safety's sake.
- The component parts for X-ray protection are as follows: When the current flows to the CRT assembly R, G, B, be sure to perform it with these parts being attached. Protection from the X-ray radiation is maintained in the state in which these parts have been installed to the CRT assembly R, G, B. Accordingly, never supply current only to the CRT assembly R, G, B.  
Moreover, the anode voltage of the CRT assembly R, G, B should always be kept not higher than the predetermined value (in the minimum brightness and picture state when non signal input is higher than 32kV). Be sure to drive the CRT assembly R, G, B by using a completely functional DEFLECTION assembly (BWJ1003) which has been adjusted completely in the combined state. (When the voltage abnormally becomes high, the X-ray protection circuit will operate.)

1. CRT assembly R, G, B (Do not dismantle CRT assemblies under any circumstances).
2. Lens assembly 40,45  
Lens assembly 40,45 color

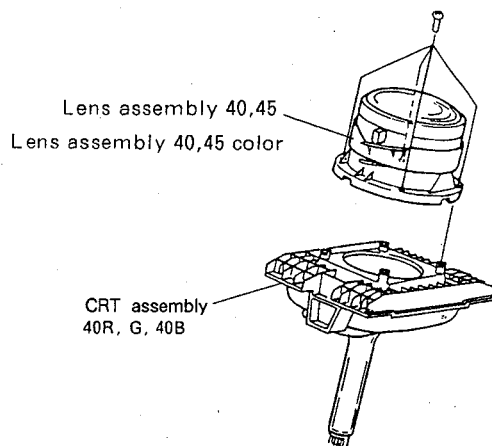


Fig. 3-2 Component parts for X-ray protection

## 4. HOW TO CLEAN

Note :

Cleaning liquid B4 (GEM1004) for LD players is usable for projection unit display.

### Jigs

Use the following for cleaning optical components such as lens, mirror and screen.

Name	Number
Cleaning cloth, MINIMAX	GED-009
Cleaning liquid, B4	GEM1004

Note: Wear gloves when holding optical components lest you should make fingerprints.

### 4.1 Method of Cleaning Lenses and Mirrors

1. Remove dust with an airbrush.
2. Apply some cleaning liquid to the cloth and wipe the dirt off with the cloth.
3. If the component is not so dirty, moisten it with breath and wipe it with the cloth.

Note: Wipe it softly lest you should scratch the lens.

### 4.2 Screen Cleaning

1. Apply the cleaning liquid to the above cloth or similar soft cloth and wipe the dirt off with the cloth.
2. Apply de-electrifier to the rear-surface or fresnel-lens side of the screen, or dust will stick on it.

Note :

- (1) Apply no alcoholic liquid such as thinner and benzine to the front surface lest the black printing on the rear surface should come off.

## 5. EXPLODED VIEWS, PACKING AND PARTS LIST

### NOTES:

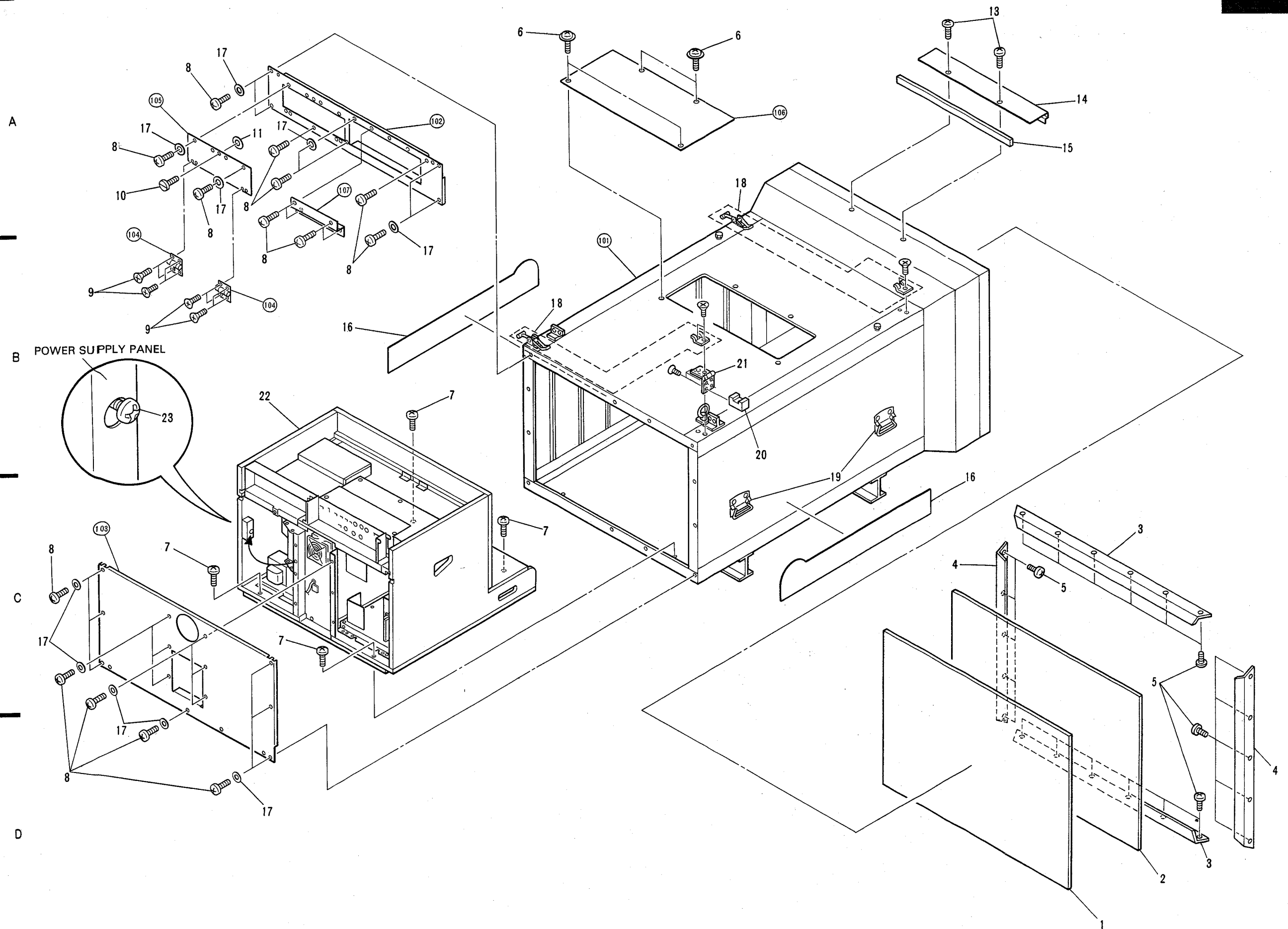
- Parts without part number cannot be supplied.
- The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

### 5.1 BLOCK ASSEMBLY AND SCREEN

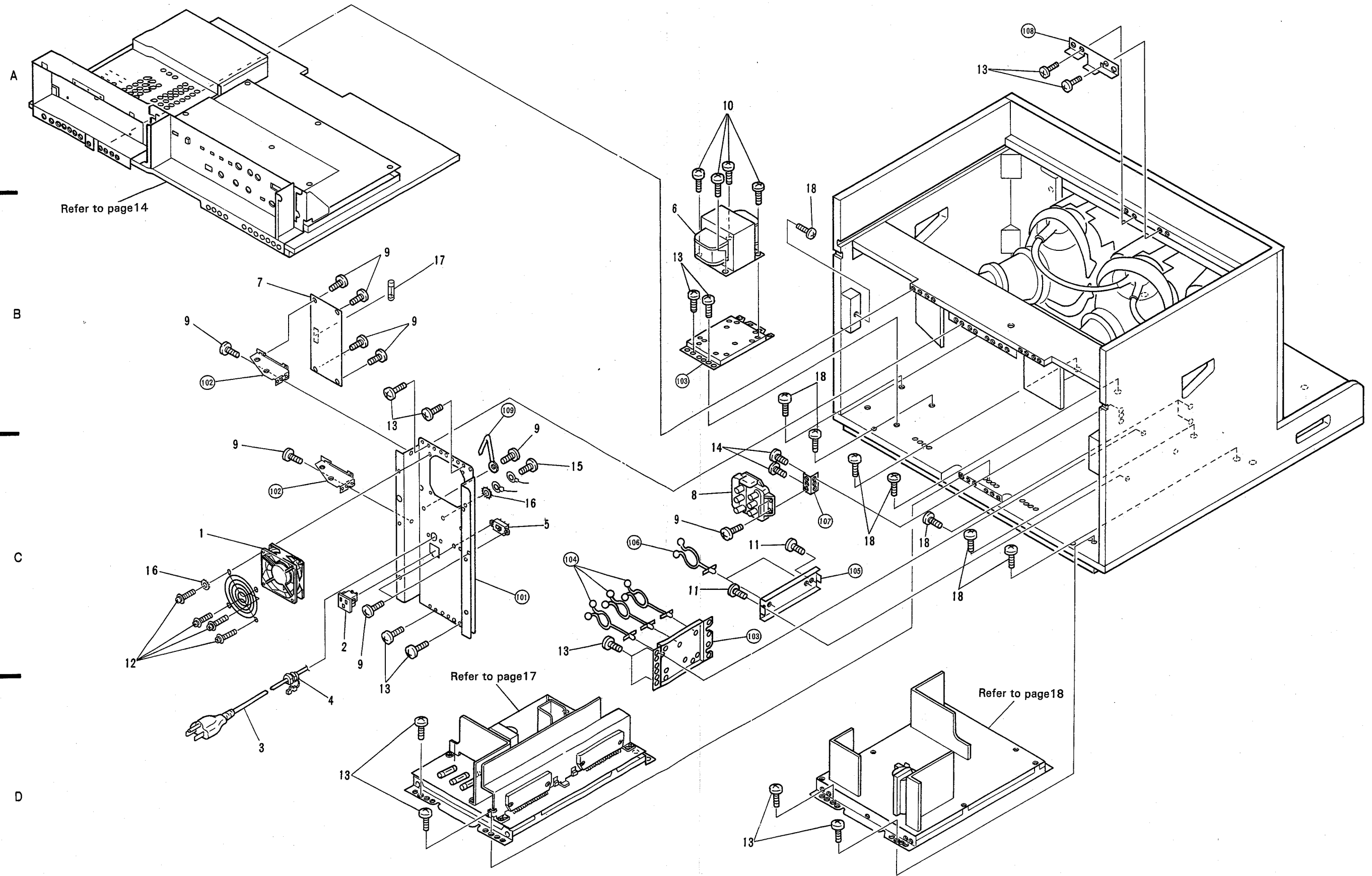
Parts list of Block assembly and Screen

Mark	No.	Description	Parts No.
	1	FRESNEL LENS	BMR1012
	2	LENTICULAR SHEET	BMR1013
	3	PANEL A	BAH1011
	4	PANEL B	BAH1012
	5	SCREW	BBA1024
	6	SCREW	PMB50P250FZB
	7	SCREW	PMB60P500FZB
	8	SCREW	BBZ30P080FZK
	9	SCREW	CBZ30P060FZK
	10	SCREW	BBA1022
	11	PUSH NUT	BBG1001
	12	.....	.....
	13	SCREW	CMZ40P100FZB
	14	SCREEN PROTECTOR	BNG1066
	15	CUSHION RUBBER	BEB1027
	16	SEAL	BAL1108
	17	WASHER	WA33F120K
	18	ADJUST FASTENER	BZN1687
	19	HANDLE	BZN1686
	20	SPACER	BZN1693
	21	HINGE	BZN1694
	22	BLOCK ASSEMBLY	BWU1004
	23	SCREW	ABA1110
	101	M CABINET	
	102	REAR PANEL A	
	103	REAR PANEL B	
	104	HINGE	
	105	COVER (CONVER BOX)	
	106	COVER (UPPER)	
	107	PLATE	





5.2 INTERIOR OF THE BLOCK ASSEMBLY



## Parts list of Interior of block assembly

Mark	No.	Description	Parts No.
	1	FAN MOTOR	AXM1012
△	2	AC SOCKET (OUTLET 1P)	AKP1079
△	3	AC POWER CORD	ADG1088
	4	STRAIN RELIEF	BEC1024
△	5	VOLTAGE SELECTOR	AKX1004
△	6	POWER TRANSFORMER (T1)	ATS1326
	7	LINE FILTER ASSEMBLY	BWJ1003
△	8	FOCUS VR (VR1)	ACX1025
	9	SCREW	BBZ30P080FZK
	10	SCREW	VBZ35P080FNC
	11	SCREW	AYC30P160FMC
	12	SCREW	PMB40P350FZB
	13	SCREW	BYC35P120FZB
	14	SCREW	BY30P100FZK
	15	SCREW	BMZ40P080FZK
	16	WASHER	WH40FZB
△	17	FUSE (8A/125V, FU105)	AEK1002
	18	SCREW	ABA1110
	101	POWER SUPPLY PANEL	
	102	PCB HOLDER A	
	103	TRANS BRACKET	
	104	CLAMPER	
	105	STAY D	
	106	CABLE CRIP	
	107	VR HOLDER	
	108	COVER	
	109	BINDER	

### 5.3 CONTROL AND INPUT/OUTPUT SECTION

Parts list of Control and Input/Output section

Mark	No.	Description	Parts No.
	1	CONTROL ASSEMBLY	BWV1002
	2	VIDEO ASSEMBLY	BWQ1003
	3	MICROCOMPUTER ( $\mu$ -COM) ASSEMBLY	AWZ1229
	4	KNOB	BAD1033
	5	HOUR METER	AAW1011
	6	CABLE	ADE1103
	7	RIVET	AEC-441
	8	SCREW	BBZ30P060FZK
	9	SPACER	BBE1007
	10	SCREW	BBZ30P080FZK
	11	SCREW	BMZ30P060FZK
	12	SCREW	BBA1017
	13	SCREW	BYC35P080FZB
	14	SCREW	BBA1021
	15	SCREW	BYC35P120FZB
	16	SCREW	BMT30P050FZK
	101	BASE PLATE	
	102	RAIL PLATE	
	103	CONNECTOR PANEL	
	104	BRACKET	
	105	PCB HOLDER A	
	106	BRACKET	
	107	BRACKET A (VIDEO)	
	108	BRACKET B (VIDEO)	
	109	CABLE CRIP	
	110	CLAMPER	
	111	CUSHION	
	112	PANEL	
	113	CHASSIS ASSEMBLY	
	114	PANEL ASSEMBLY	
	115	BONNET A	
	116	PCB SUPPORT	
	117	CABLE STOPPER	
	118	BONNET B	

A

B

C

0

A

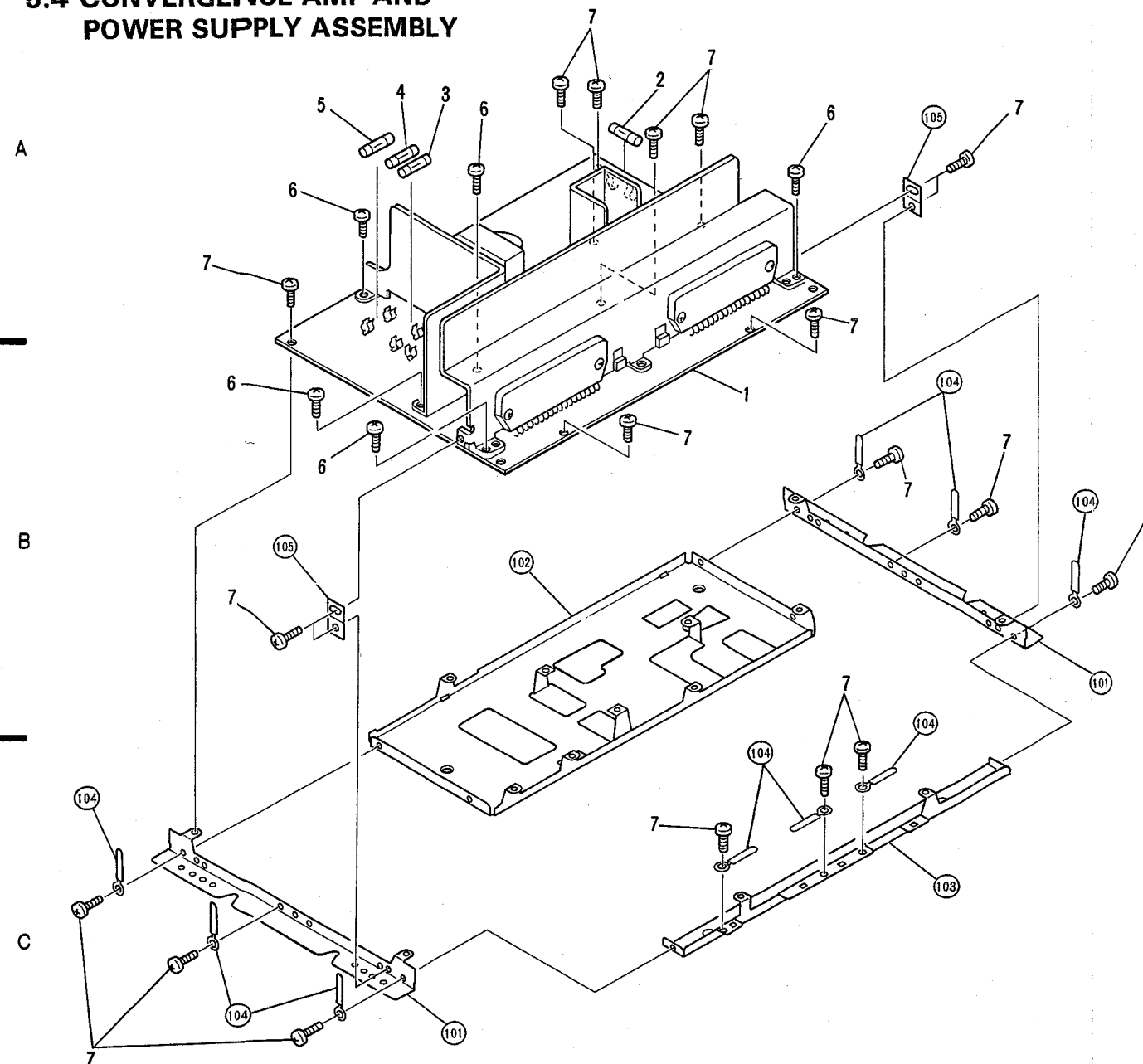
B

C

D

# RM-V2000

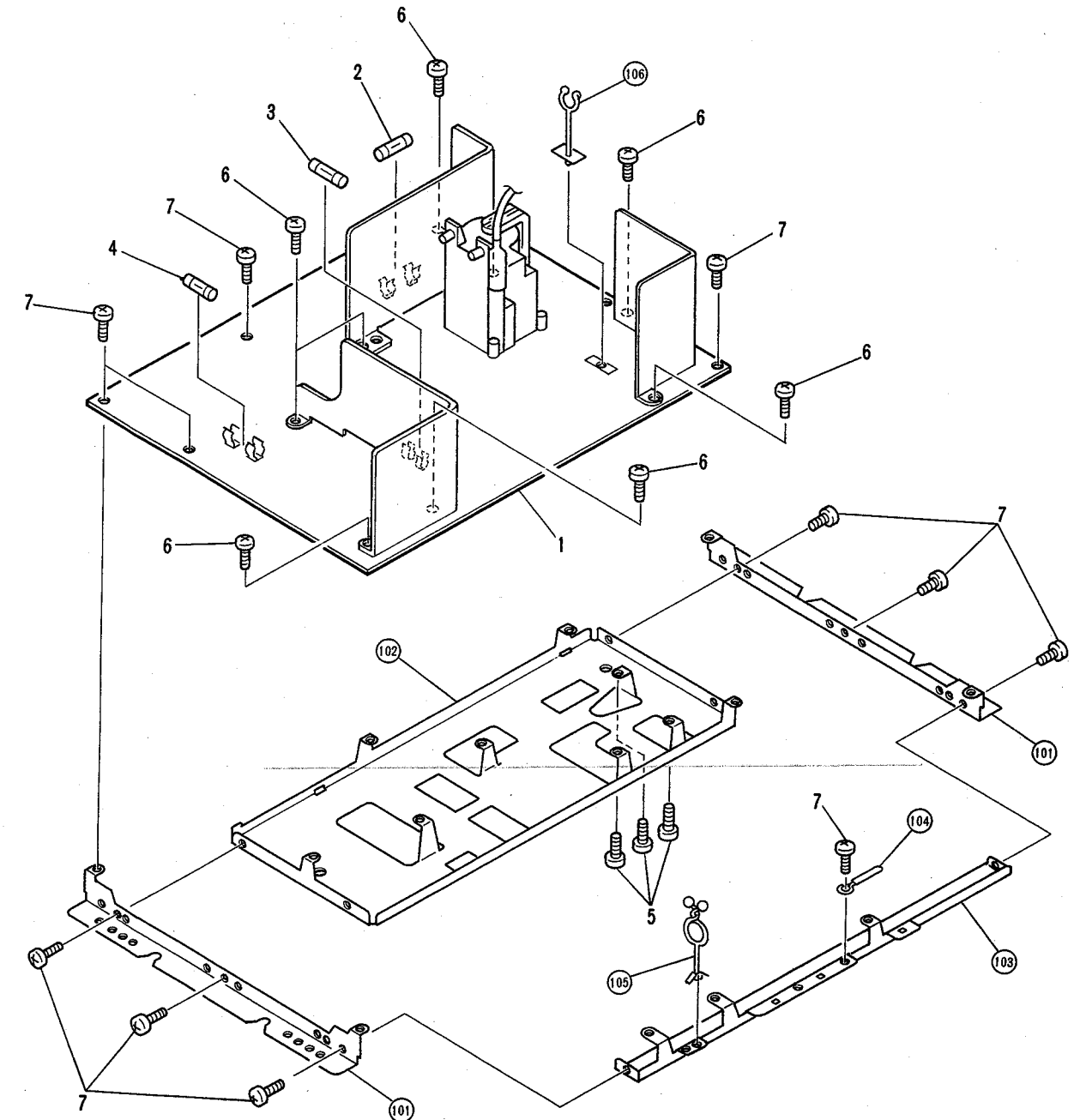
## 5.4 CONVERGENCE AMP AND POWER SUPPLY ASSEMBLY



Parts list of Convergence amp/Power supply assembly

Mark	No.	Description	Parts No.	Mark	No.	Description	Parts No.
	1	CONVERGENCE AMP/POWER SUPPLY ASSEMBLY	BWZ1224	101	BRACKET A		
	2	FUSE (6.3A/125V, FU101)	AEK-309	102	BRACKET B		
⚠	3	FUSE (4A/125V, FU102)	AEK1018	103	BRACKET C		
⚠	4	FUSE (4A/125V, FU103)	AEK1018	104	BINDER		
⚠	5	FUSE (4A/125V, FU104)	AEK1018	105	HEAT SINK HOLDER		
	6	SCREW	ABA1099				
	7	SCREW	BBZ30P080FZK				

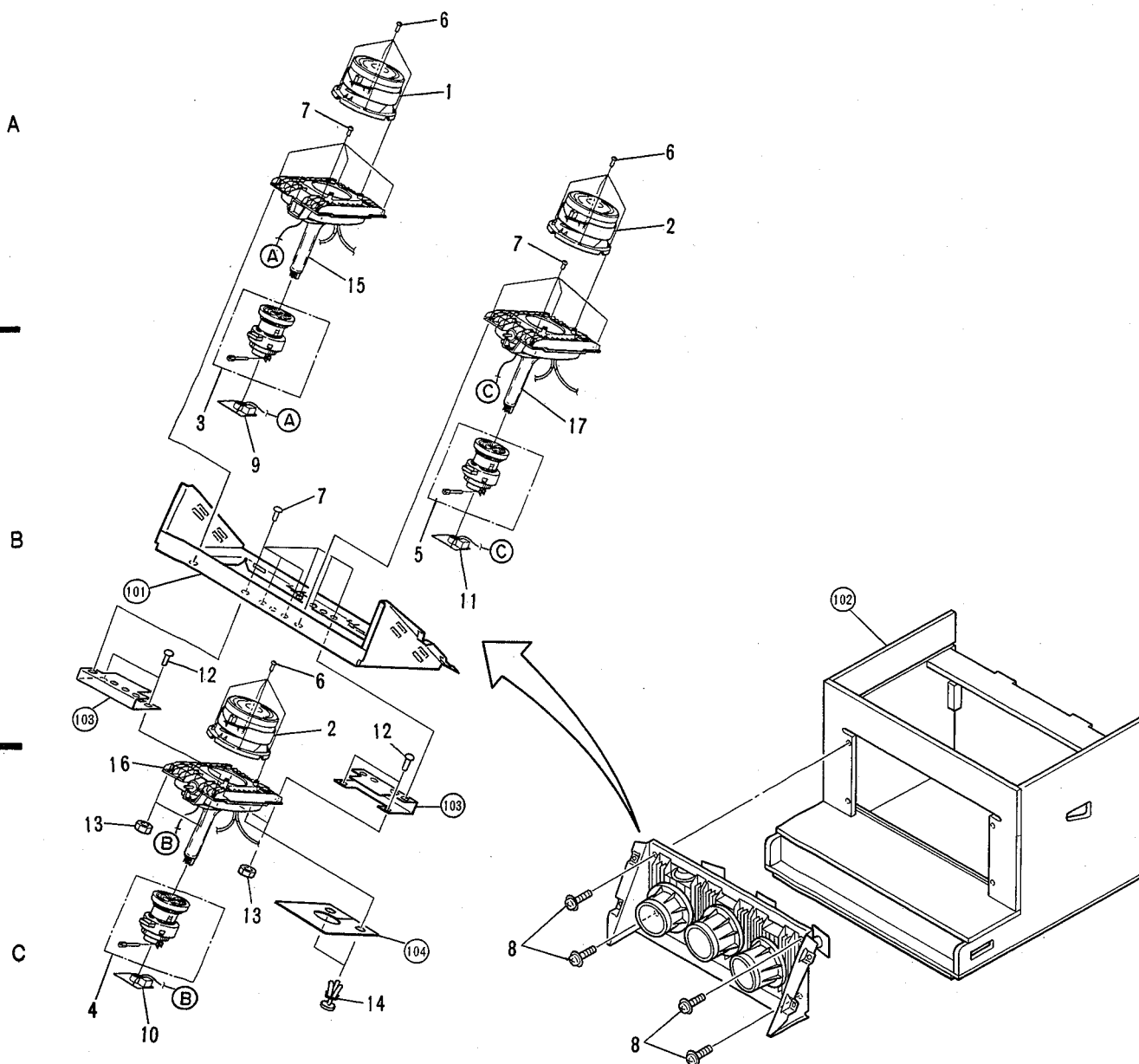
## 5.5 DEFLECTION ASSEMBLY



Parts list of Deflection assembly

Mark	No.	Description	Parts No.	Mark	No.	Description	Parts No.
	1	DEFLECTION ASSEMBLY	BWJ1003	101	BRACKET A		
⚠	2	FUSE (4A/125V, FU301)	AEK1018	102	BRACKET B		
⚠	3	FUSE (4A/125V, FU302)	AEK1018	103	BRACKET C		
⚠	4	FUSE (8A/250V, FU303)	AEK1038	104	CLAMPER		
	5	SCREW	PPZ40P120FMC	105	CABLE CRIP		
	6	SCREW	ABA1099	106	CLAMPER		
	7	SCREW	BBZ30P080FZK				

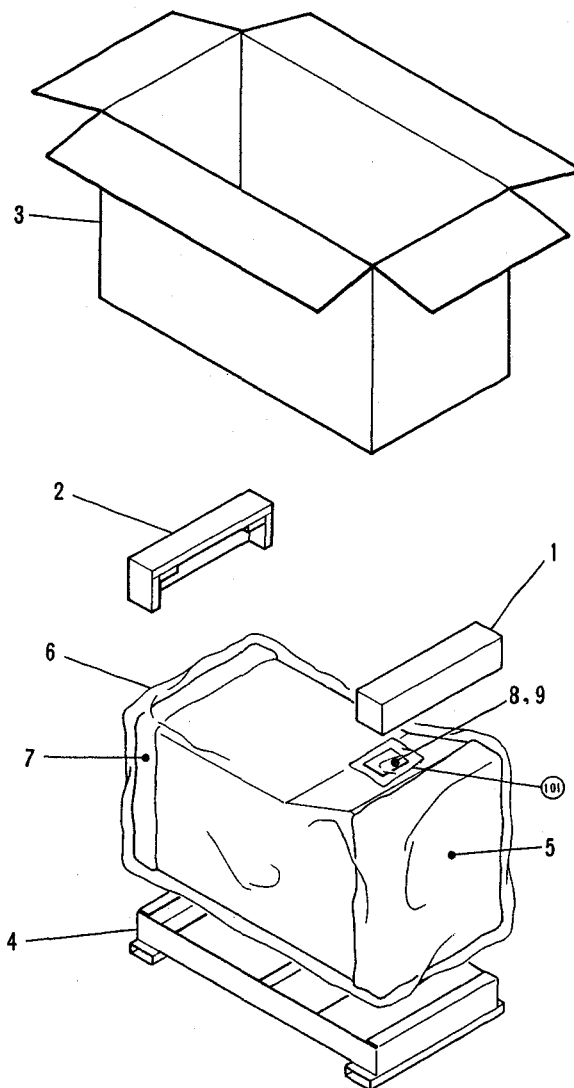
## 5.6 CRT ASSEMBLY



Parts list of CRT assembly

Mark	No.	Description	Parts No.	Mark	No.	Description	Parts No.
	1	LENS ASSEMBLY 40,45 COLOR	AMR2233		14	RIVET	AEC-441
	2	LENS ASSEMBLY 40,45	AMR2217		15	CRT ASSEMBLY (40R)	AWY1109
	3	DEFLECTION YOKE (R)	ATL1067		16	CRT ASSEMBLY (G)	AWY1106
	4	DEFLECTION YOKE (G)	ATL1068		17	CRT ASSEMBLY (40B)	AWY1110
	5	DEFLECTION YOKE (B)	ATL1069				
	6	SCREW	AMZ40P080FZK		101	CRT STAND	
	7	SCREW	FBT40P120FZK		102	CABINET	
	8	SCREW	PMB50P250FZB		103	CRT SPACER	
	9	R CRT DRIVE ASSEMBLY	BWZ1226		104	SHEET	
	10	G CRT DRIVE ASSEMBLY	BWZ1227				
	11	B CRT DRIVE ASSEMBLY	BWZ1228				
	12	SCREW	PMB50P250FZB				
	13	NUT	NB50FMC				

5.7 PACKING



A

B

C

D

Parts list of Packing

Mark	No.	Description	Parts No.
	1	PAD B	BAH1024
	2	PAD C	BAH1025
	3	UPPER CARTON	BHD1122
	4	UNDER CARTON	BHD1123
	5	FRONT SHEET	BHG1002
	6	COVER	BHG1003
	7	SHEET	BHG1011
	8	OPERATING INSTRUCTIONS	BRD1003
	9	UL SAFE CARD	BRH1003
	101	NYLON BAG	



# 6. SCHEMATIC DIAGRAMS AND P.C. BOARD PATTERNS

## 6.1 OVER ALL WIRING DIAGRAM

### SIGNAL ROUTE

[Solid Line] : CHARGED SECTION  
 [Dashed Line] : VIDEO SIGNAL, Y SIGNAL  
 [Dotted Line] : COLOR (G) SIGNAL  
 [Dash-dot Line] : V. DEFLECTION  
 [Long Dash] : H. DEFLECTION  
 [Thick Solid Line] : R SIGNAL  
 [Thin Solid Line] : G SIGNAL  
 [Double Solid Line] : B SIGNAL

- RESISTORS:**  
Indicated in  $\Omega$ , 1/4W, 1/6W and 1/8W,  $\pm 5\%$  tolerance unless otherwise noted k; k $\Omega$ , M; M $\Omega$ . (F);  $\pm 1\%$ , (G);  $\pm 2\%$ , (K);  $\pm 10\%$ , (M);  $\pm 20\%$  tolerance.
- CAPACITORS:**  
Indicated in capacity ( $\mu$ F)/voltage (V) unless otherwise noted p; pF. Indication without voltage is 50V except electrolytic capacitor.
- VOLTAGE, CURRENT:**  
 [Symbol] : DC voltage (V) at no input signal.  
 • Tuner DC voltage at 9 ch, 60dB  $\mu$  P/S=6dB, 1kHz ST 30% MTS MAIN  
 [Symbol] mA : DC current at no input signal.

### 4. OTHERS:

- : Signal route.
- ⊗ : Adjusting point.
- The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- \* marked capacitors and resistors have parts numbers.
- Parts marked by  $\star$  are important parts which relate with X-ray radiation. If any of these parts need to be replaced, always replace with specified parts.
- Parts marked by X are important parts which relate with X-ray radiation. If a failure occurs in any of these parts, replace the printed circuit board assembly where the relevant part has already been adjusted as a working component. Do not replace the actual part itself.
- If any part marked by X is replaced, there is danger of being exposed to X-rays.

This is the basic schematic diagram.

LINE VOLTAGE SELECTOR  
S1 100V-120V

**CONTROL Assembly**  
 S501 SELECT  
 S502 COLOR  
 S503 ADJ. MODE  
 S504 KEY LOCK  
 S505 FACTORY  
 S506 STD  
 S507 TEST  
 S508 RIGHT  
 S509 DOWN  
 S510 FAST  
 S511 UP  
 S512 LEFT  
 S513 BLUE  
 S514 GREEN  
 S515 RED

**VIDEO Assembly**  
 S701 75 $\Omega$  SW ON-OFF

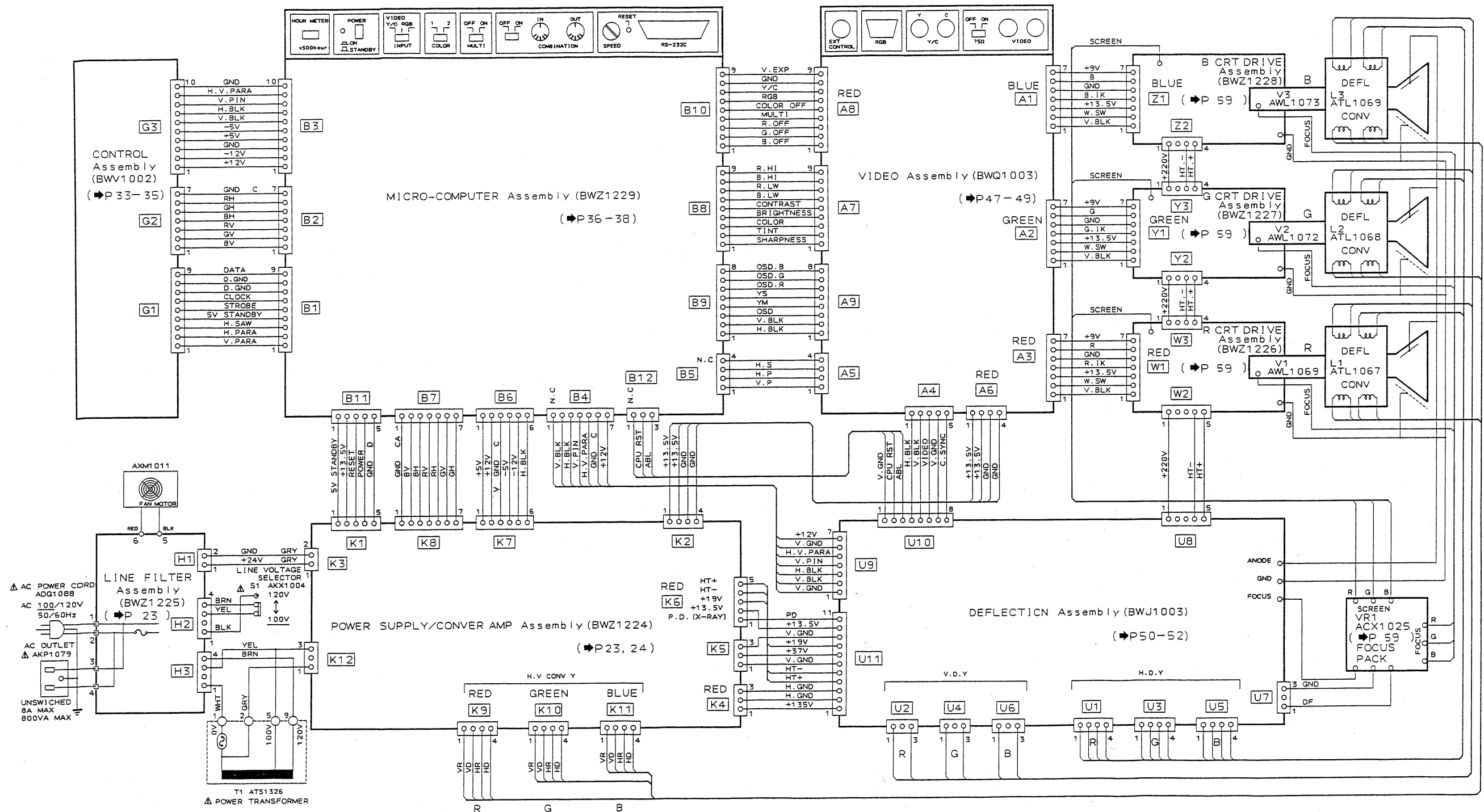
**MICRO COMPUTER Assembly**  
 S231 RESET  
 S232 SPEED  
 S233 COMBI  
 S234 MULTI  
 S235 COLOR  
 S236 INPUT  
 S237 POWER  
 S238 OSD

A

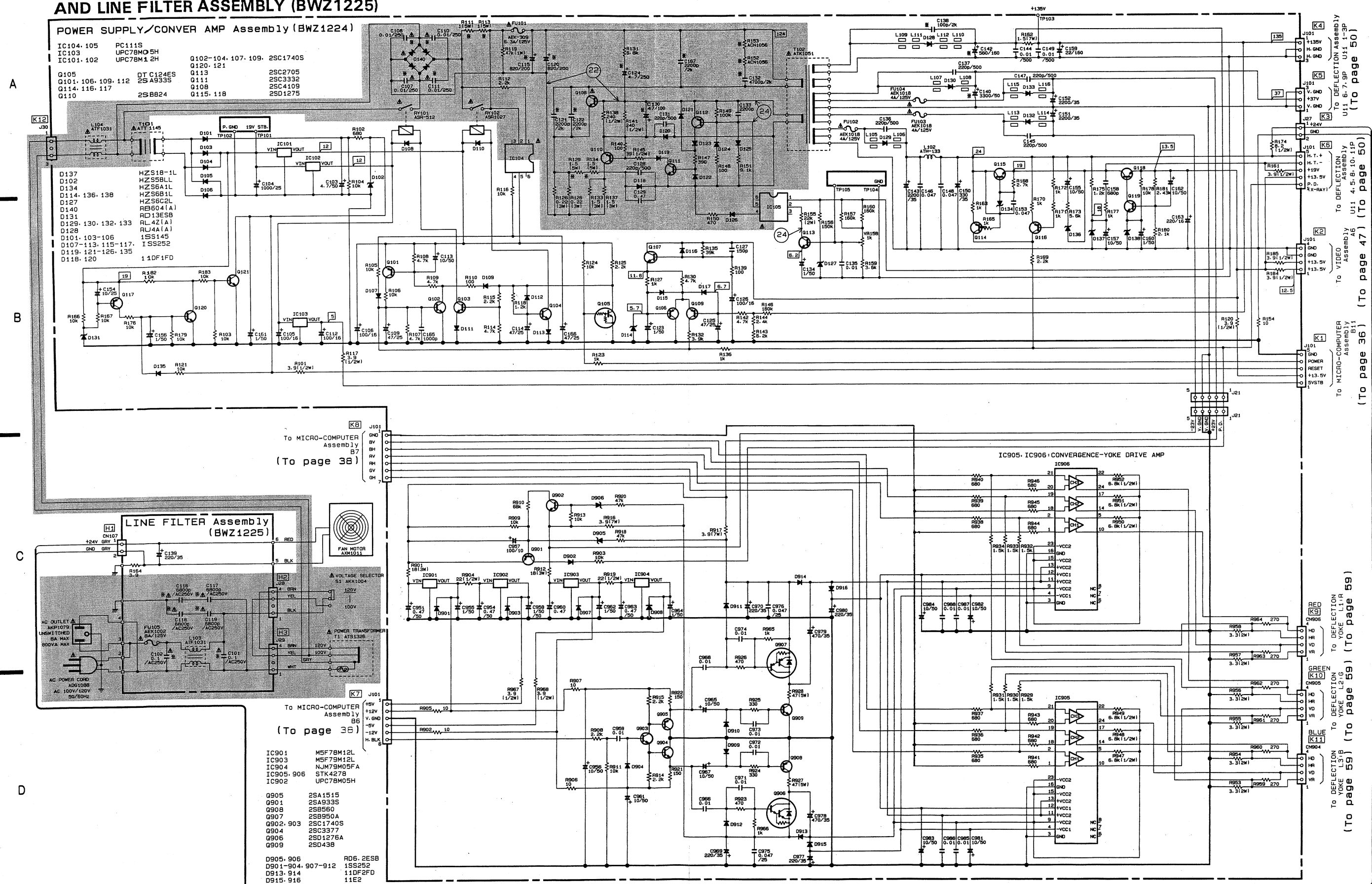
B

C

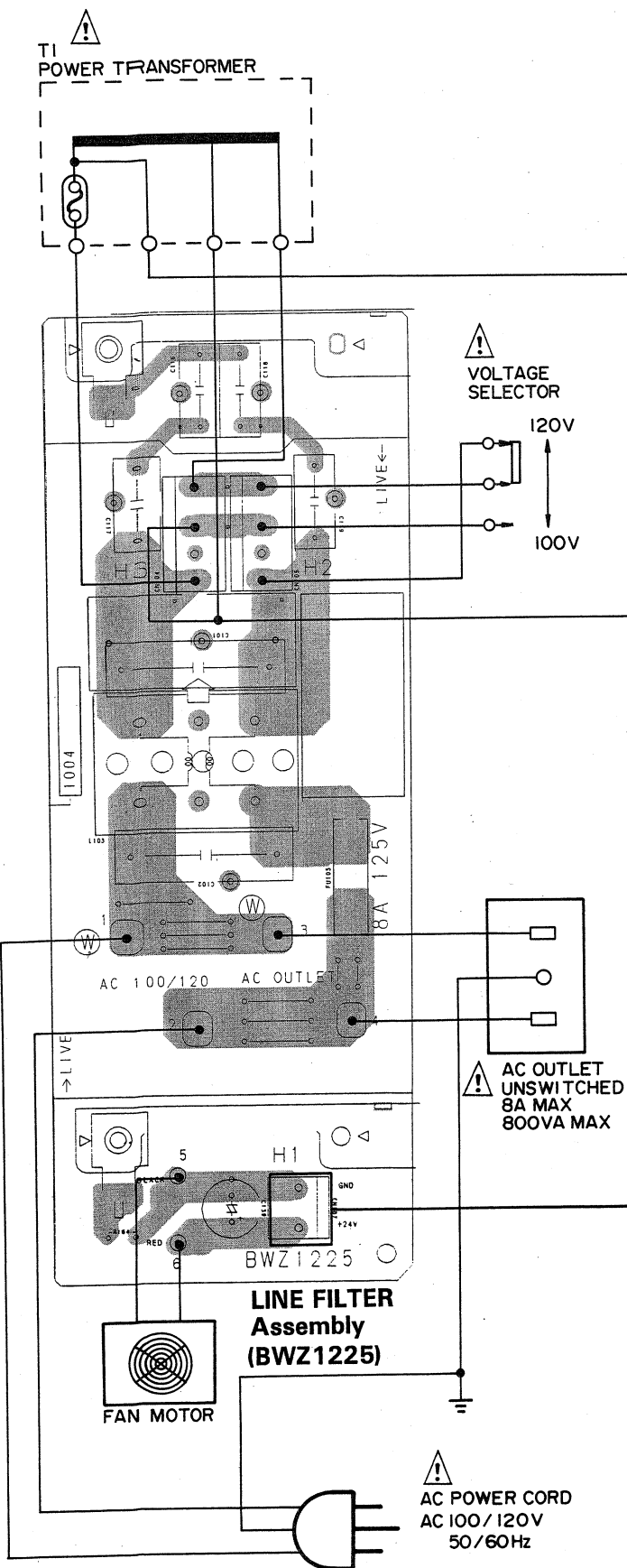
D



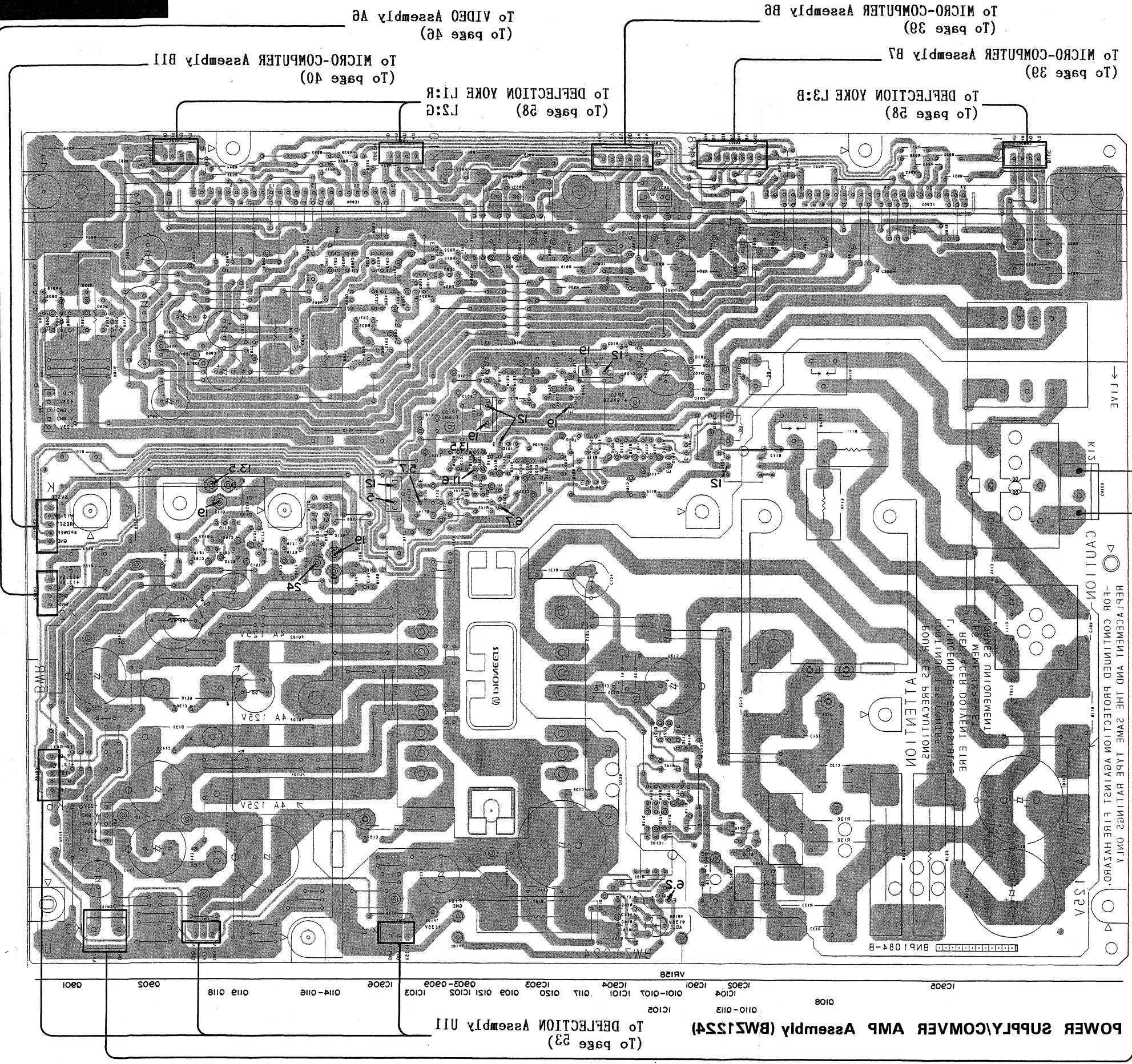
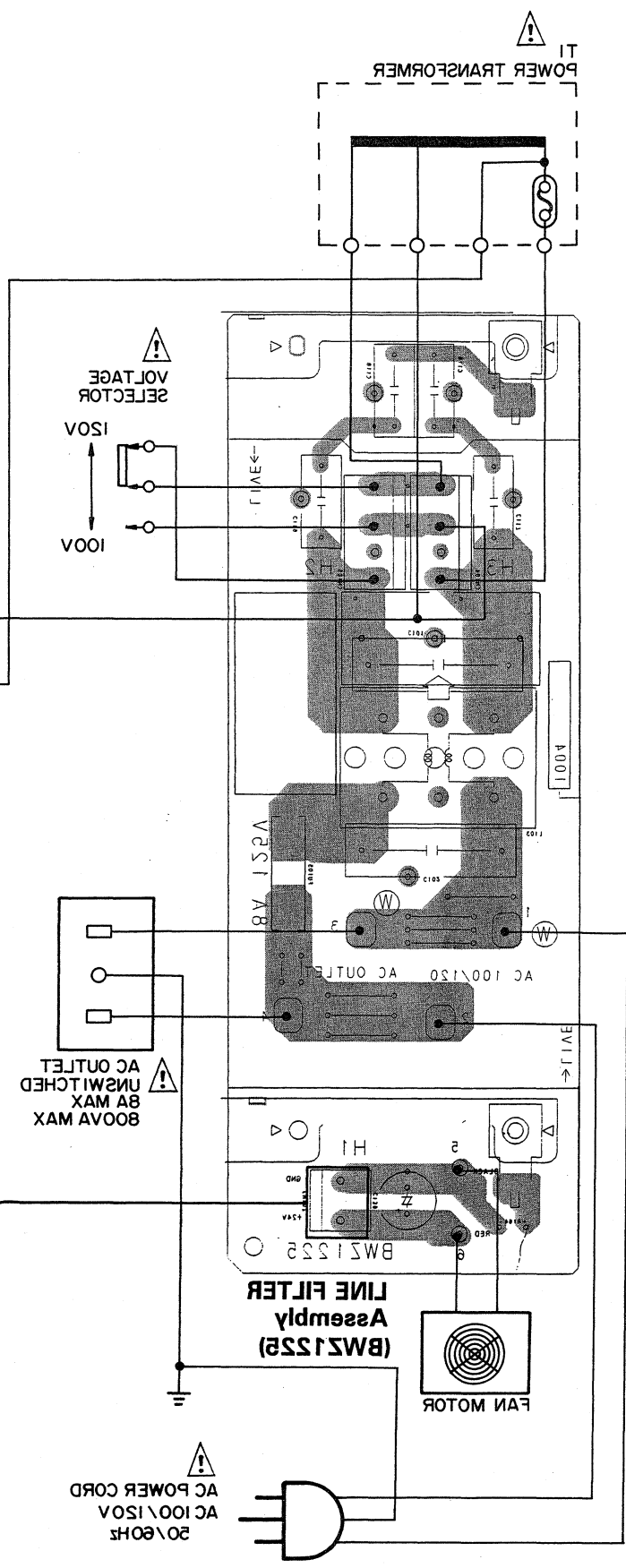
## 6.2 CONVERGENCE AMP/POWER SUPPLY (BWZ1224) AND LINE FILTER ASSEMBLY (BWZ1225)











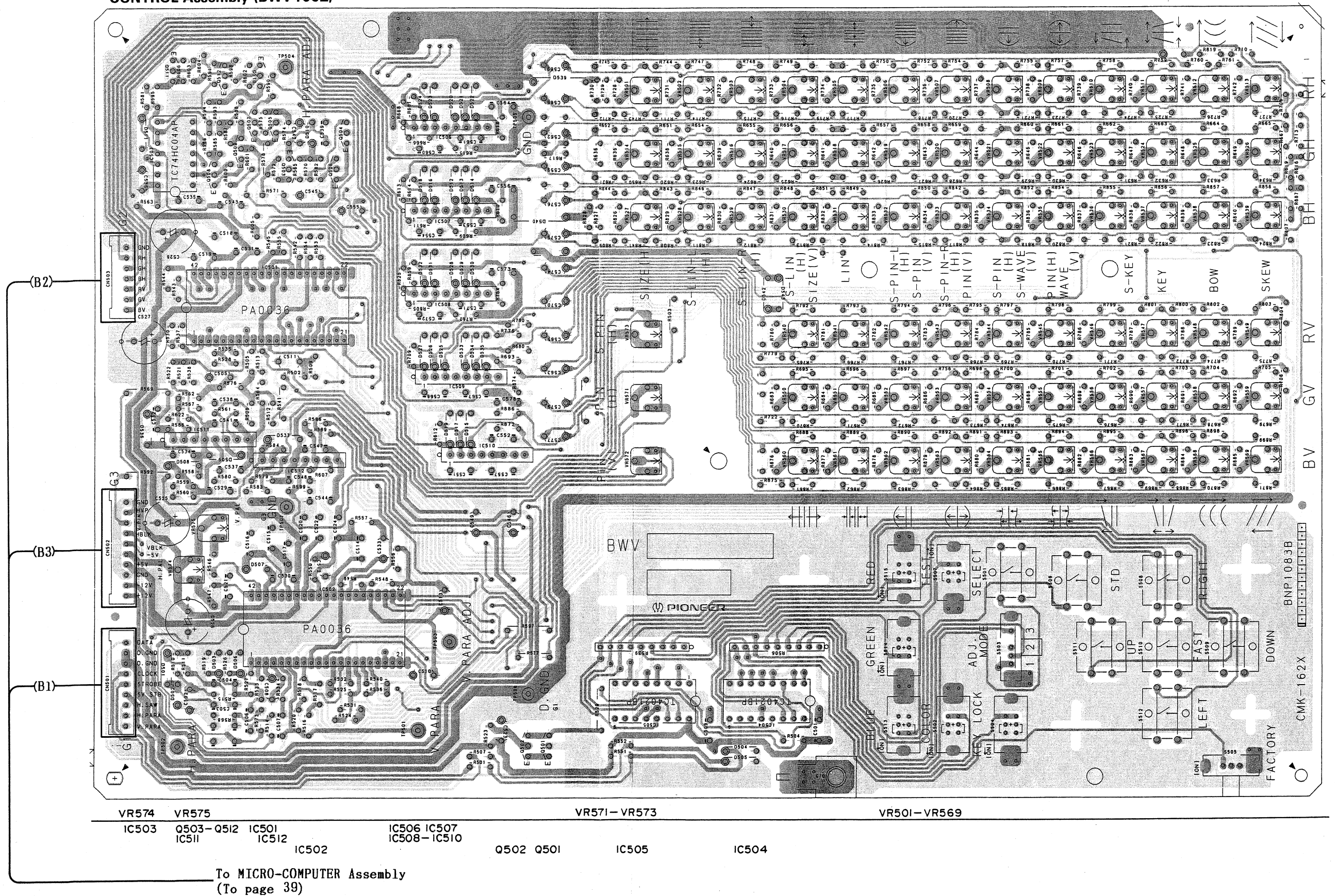






### 6.3 CONTROL ASSEMBLY (BWV1002)

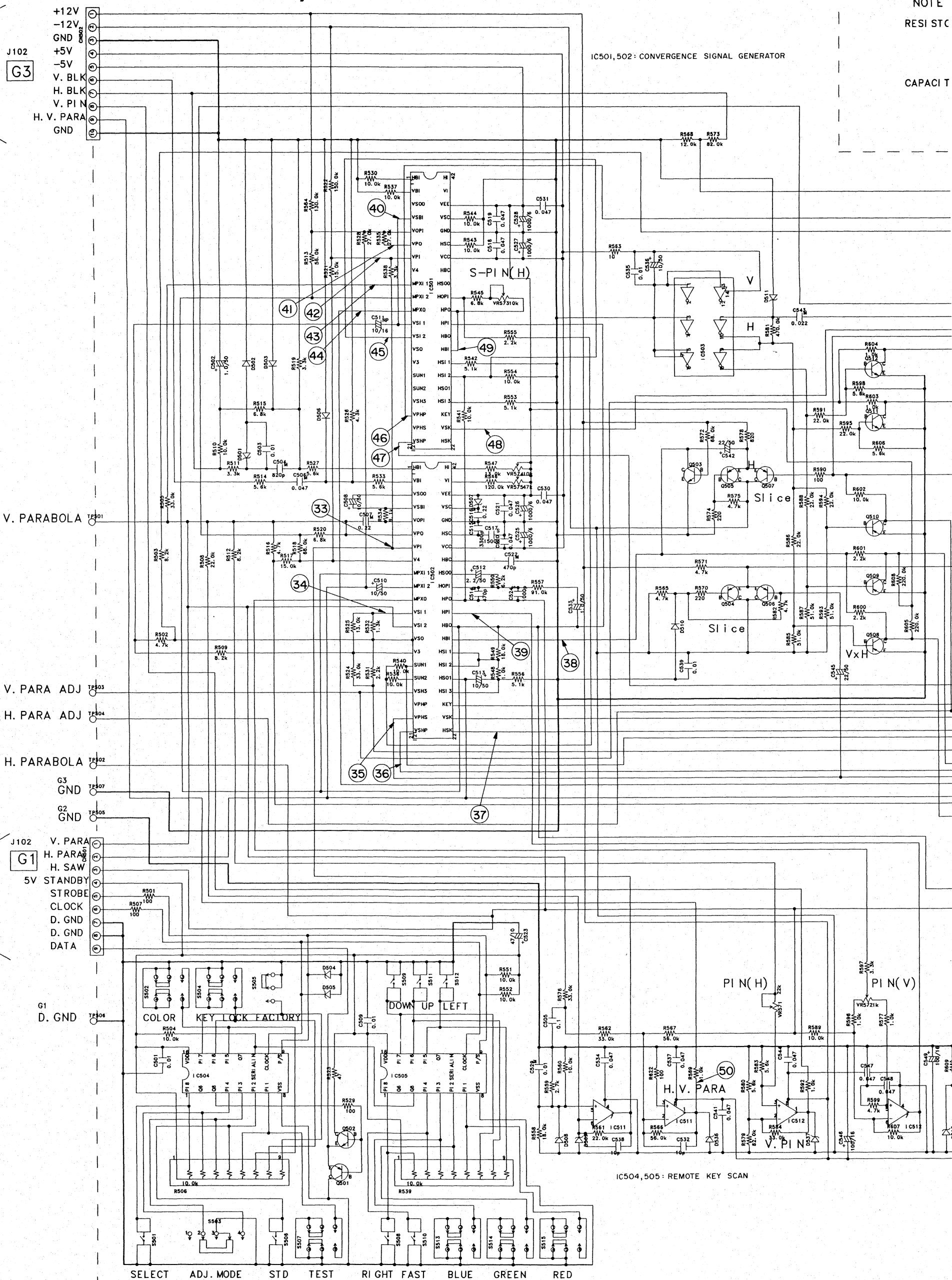
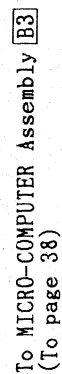
## CONTROL Assembly (BWV 1002)



## CONTROL Assembly (BWV1002)

NOTE  
RESI STC

CAPACIT



To MICRO-COMPUTER Assembly **B1**  
(To page 38)

IC504,505: REMOTE KEY SCAN

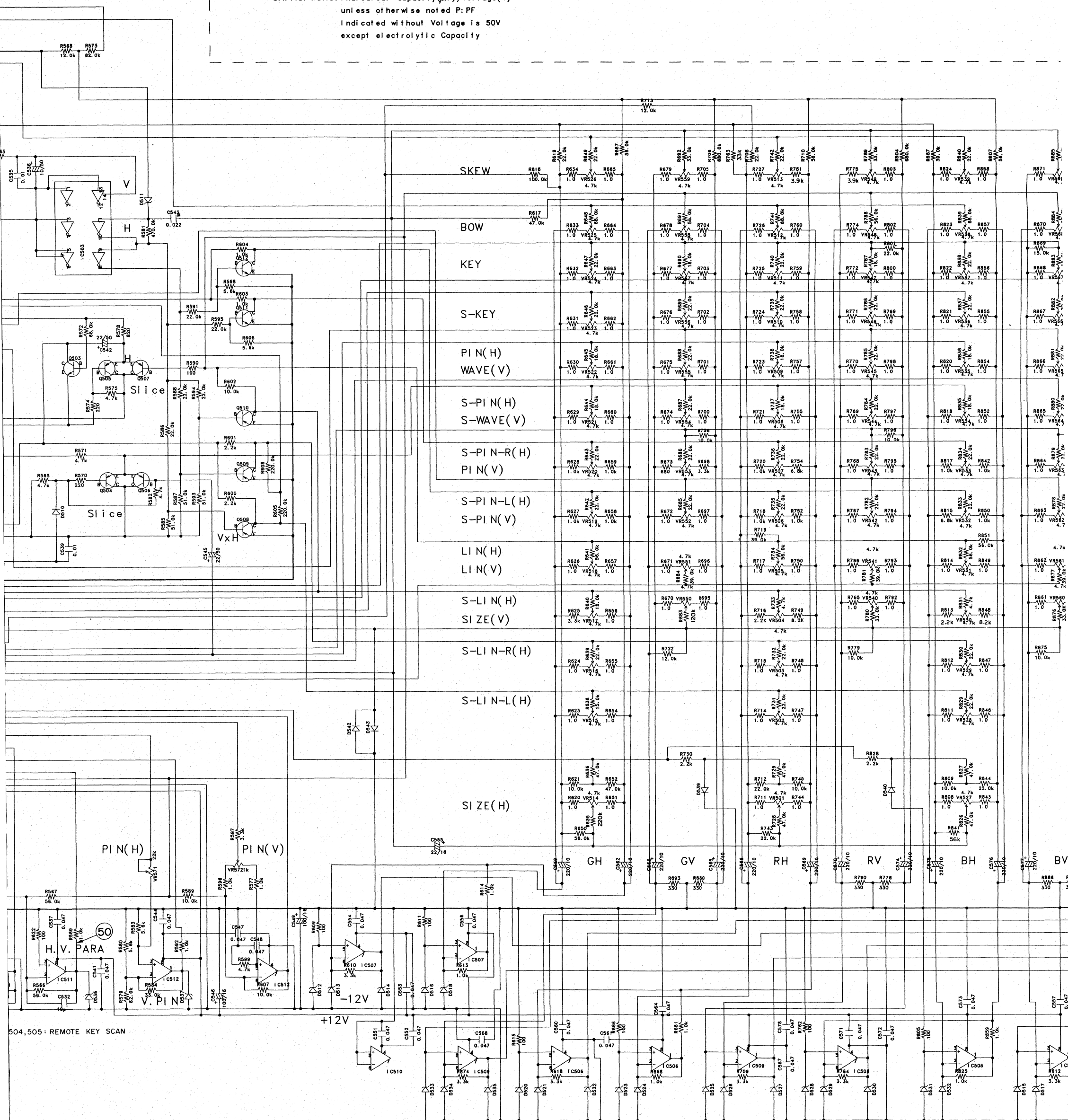


NOTE

RESISTORS: Indicated 1/8W±5%  
tolerance unless otherwise  
noted k: kΩ

CAPACITORS: Indicated. Capacity ( $\mu$ F)/Voltage (V)  
unless otherwise noted P: PF  
Indicated without Voltage is 50V  
except electrolytic Capacity

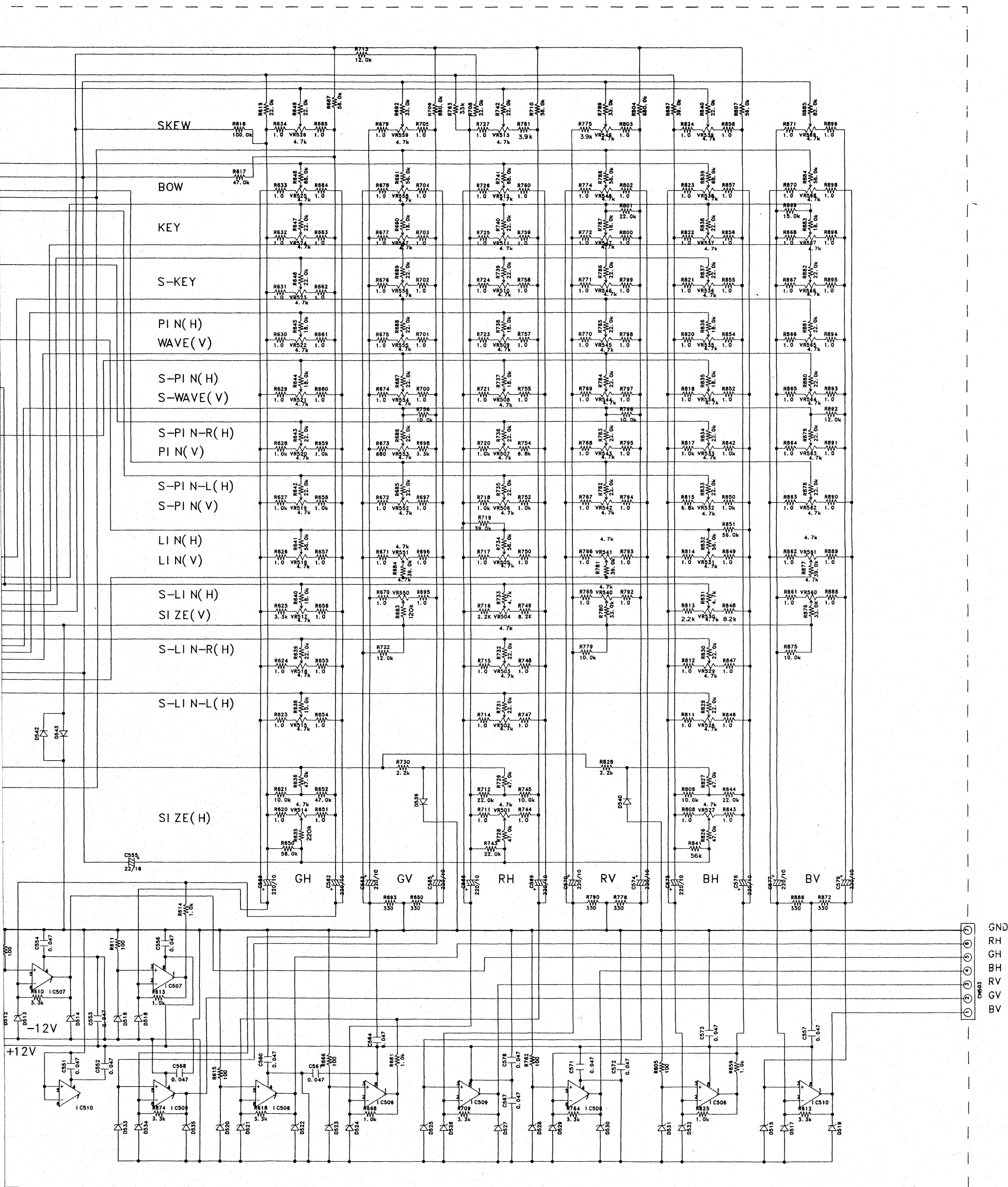
502: CONVERGENCE SIGNAL GENERATOR





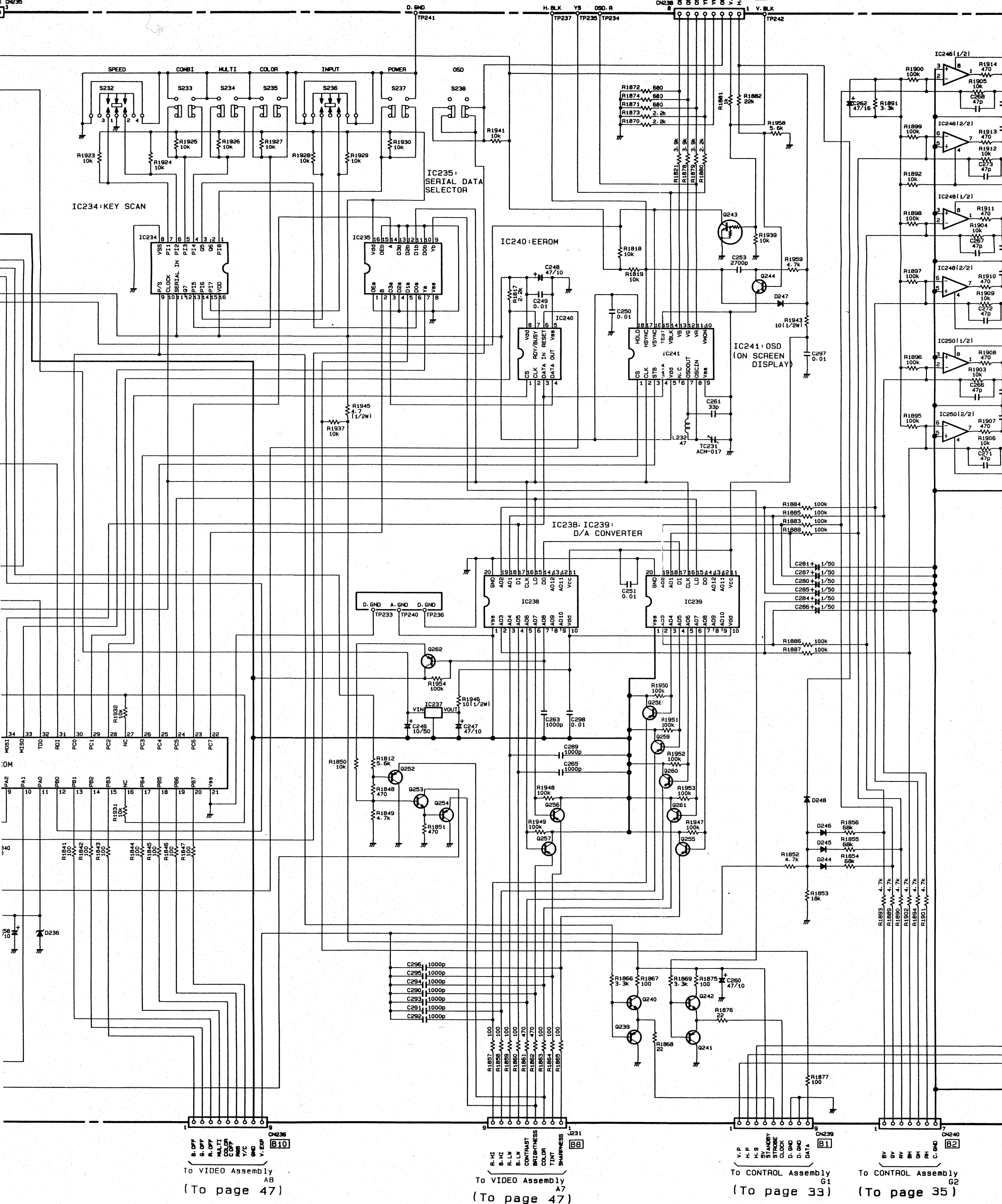
RES: Indicated. 1/8W±5%  
tolerance unless otherwise  
noted k: kΩ

ORS: Indicated. Capacity( $\mu$ F)/Voltage(V)  
unless otherwise noted P: PF  
Indicated without Voltage is 50V  
except electrolytic Capacity



To MICRO-COMPUTER Assembly B2  
(To page 38)



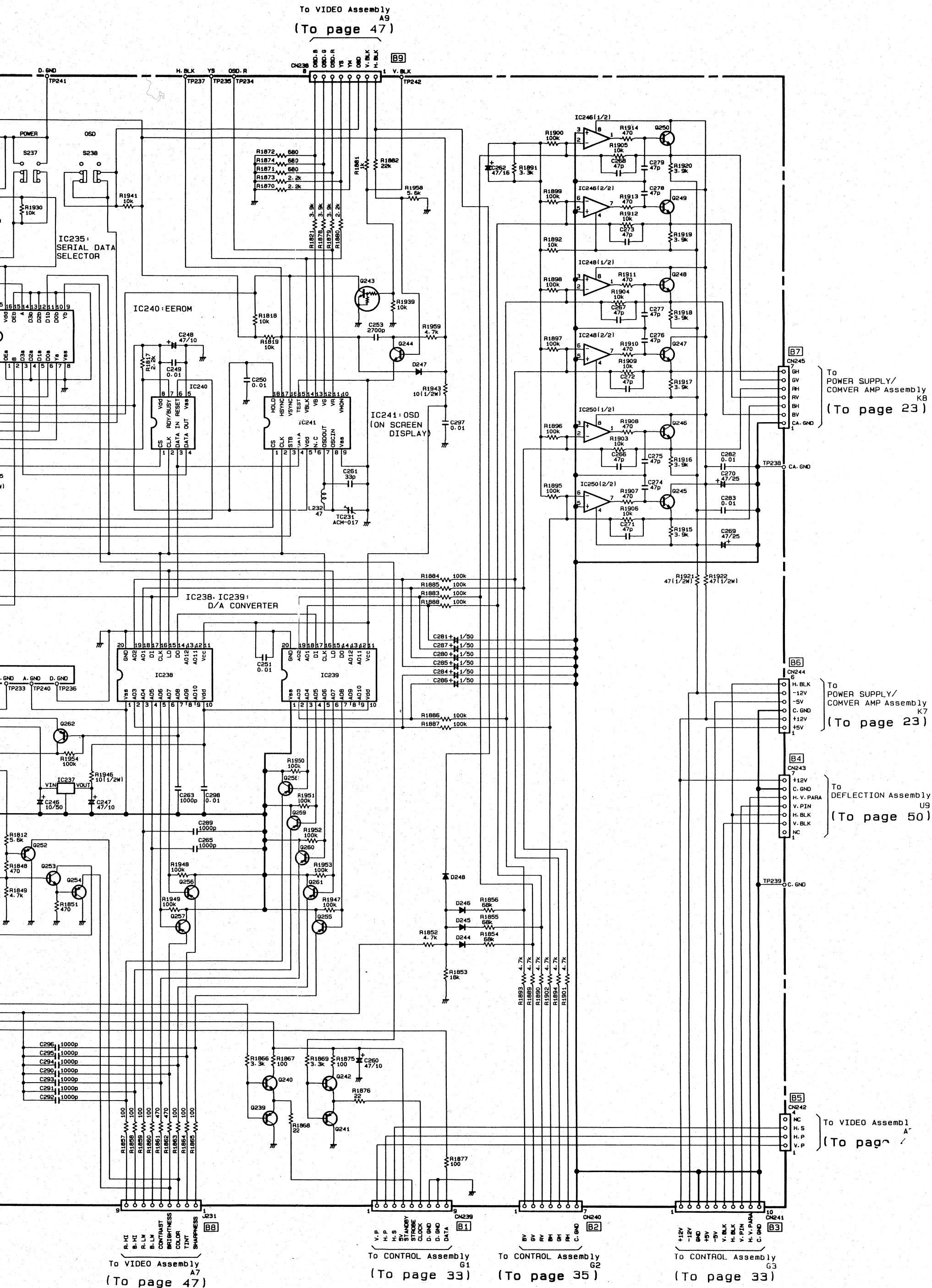


To VIDEO Assembly  
A8  
(To page 47)

To VIDEO Assembly  
A7  
(To page 47)

To CONTROL Assembly  
G1  
(To page 33)

To CONTROL Assembly  
G2  
(To page 35)





1. This P.C.B connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the following Table.

Others	
P.C.B. pattern diagram indication	Part Name
IC	IC
S	Switch
RY	Relay
L	Coil
F	Filter
VR	Variable resistor or Semi-fixed resistor

3. The capacitor terminal marked with  $\ominus$  (double circles) shows negative terminal.
4. The diode terminal marked with  $\ominus$  (double circles) shows cathode side.
5. The transistor terminal to which E is affixed shows the emitter.





A

A

(To page 23)  
To DEFLECTION Assembly U9

(To page 26)  
To CONVER AMP Assembly and POWER SUPPLY Assembly K7

(To page 26)  
To CONVER AMP Assembly and POWER SUPPLY Assembly K8

(To page 42)  
To VIDEO Assembly A7

(To page 42)  
To VIDEO Assembly A9

(To page 42)  
To VIDEO Assembly A8

(To page 26)  
To CONVER AMP Assembly and  
POWER SUPPLY Assembly K1

(To page 23)  
To DEFLECTION Assembly U10

MICROCOMPUTER Assembly (BW2122A)

B

(G3)

(G2)

(G1)

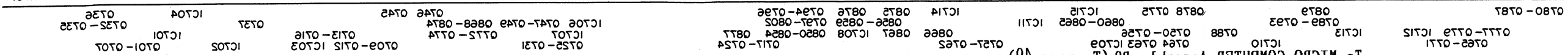
D

(To page 31)  
To CONTROL Assembly

(To page 46)  
To VIDEO Assembly A2

053A 0541 0540  
0545 IC546  
0520 0543  
IC537  
0542  
IC547  
0546 0545 0541 0560 052A 0528  
IC538  
0525 IC540  
0525 0526 0522  
IC539  
IC541  
0543 0544 0525 0523 0524  
IC536  
0536  
0538 0531 0523  
0521 IC531 0535 0523 0521  
IC533







**6.5 VIDEO ASSEMBLY**  
**(BWQ1003)**

To R CRT DRIVE Assembly W1  
(To page 58)

To G CRT DRIVE Assembly Y1  
(To page 58)

To MICRO-COMPUTER Assembly B10  
(To page 40)

To DEFLECTION Assembly U10  
(To page 53)

To MICRO-COMPUTER Assembly B5

VIDEO Assembly (BWQ1003)	(To page 58) To B CRT DRIVE Assembly Z1 (To page 58)	To MICRO-COMPUTER Assembly B8 (To page 39)	(To page 39)
-----------------------------	--	---	--------------

6.5 VIDEO ASSEMBLY (BWQ1003)

- To R CRT DRIVE Assembly W1 (To page 58)
- To G CRT DRIVE Assembly Y1
- To MICRO-COMPUTER Assembly B10 (To page 40)
- To DEFLECTION Assembly U10 (To page 53)
- To MICRO-COMPUTER Assembly B5

(BWQ1003) VIDEO Assembly

(To page 58) To G CRT DRIVE Assembly Y1  
(To page 58) To B CRT DRIVE Assembly Z1

To MICRO-COMPUTER Assembly B10  
(To page 40)

To MICRO-COMPUTER Assembly B8

To DEFLECTION Assembly U10  
(To page 53)

To MICRO-COMPUTER Assembly B5  
(To page 39)

VIDEO Assembly (BWQ1003)	(To page 58) To B CRT DRIVE Assembly Z1 (To page 58)	To MICRO-COMPUTER Assembly B8 (To page 39)	(To page 39)
-----------------------------	--	---	--------------

6.5 VIDEO ASSEMBLY (BWQ1003)

To G CRT DRIVE Assembly Y1 (To page 58)

To MICRO-COMPUTER Assembly B10 (To page 40)

To DEFLECTION Assembly U10 (To page 53)

To MICRO-COMPUTER Assembly B5 (To page 32)

VIDEO Assembly (BWQ1003)	(To page 58) To B CRT DRIVE Assembly Z1 (To page 58)	To MICRO-COMPUTER Assembly B8 (To page 39)	(To page 39)
-----------------------------	--	---	--------------

**6.5 VIDEO ASSEMBLY** To R CRT DRIVE Assembly W1  
(To page 58)

To MICRO-COMPUTER Assembly B10

To CONVER AMP Assembly and POWER SUPPLY Assembly K2  
(To page 26)

To DEFLECTION Assembly U10

6.5 VIDEO ASSEMBLY (BWQ1003)

To G CRT DRIVE Assembly Y1 (To page 58)

To MICRO-COMPUTER Assembly B10 (To page 40)

To DEFLECTION Assembly U10 (To page 53)

To MICRO-COMPUTER Assembly B5 (To page 32)

VIDEO Assembly  
(BWQ1003)

To G CRT DRIVE Assembly Y1  
(To page 58)

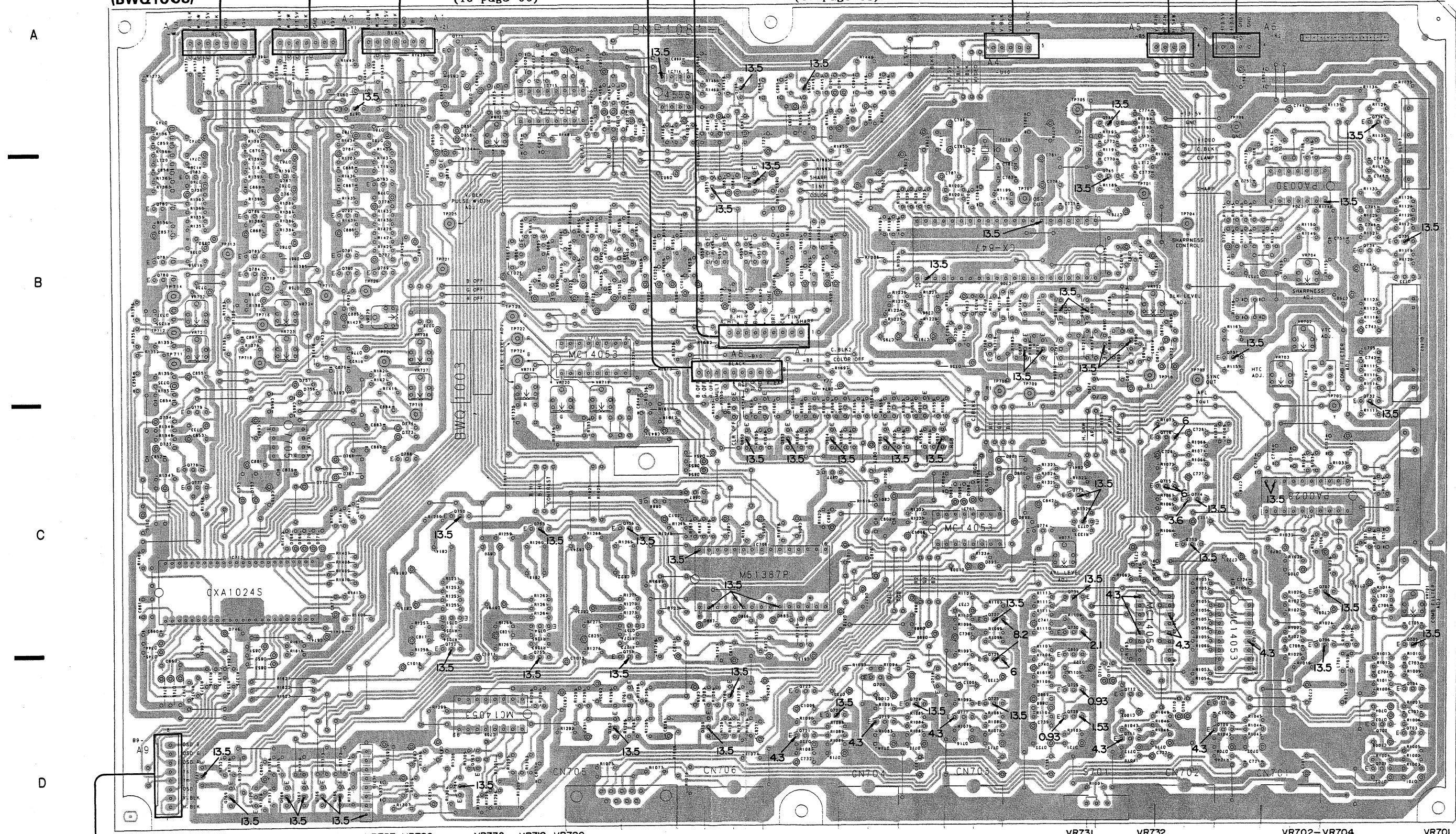
To B CRT DRIVE Assembly Z1  
(To page 58)

(To page 40)

To MICRO-COMPUTER Assembly B8  
(To page 39)

(To page 53)

To MICRO-COMPUTER Assembly B5  
(To page 39)



	Q780 - Q787	Q879	Q878 0775	IC715	IC714	0875 0876	0794 - 0796	0746	0745	IC704	0736	0732 - 0735
		Q879		0860 = 0865	IC711	0856 - 0859	0797 - 0802	IC706	0747 - 0749	0868 - 0874	Q737	

Q780-Q787	Q879	Q878 Q775	IC715	IC714	Q875 Q876	Q794-Q796	Q746 Q745	IC704	Q736
	Q789-Q793		Q860-Q865	IC711	Q856-Q859	Q797-Q802	IC706 Q747-Q749	Q868-Q874	Q737
					Q866 Q867	IC708	Q772-Q774	Q713-Q716	IC701
					Q850-Q854	Q877			Q732-Q735

0780-0787	0879	0878 0775	IC715	IC714	0875	0876	0794-0796	0874	0745	0737	IC704	0736	0732-0735
-----------	------	-----------	-------	-------	------	------	-----------	------	------	------	-------	------	-----------

Q780-Q787	Q789-Q793	Q860-Q865	IC711	Q856-Q859	Q797-Q802	IC706	Q747-Q749	Q868-Q874	Q737	Q732-Q735
Q777-Q779	IC712	IC713	Q788	Q750-Q756	Q866	Q867	IC708	Q850-Q854	Q877	Q713-Q716
Q775-Q776	IC710	Q764	Q763	IC709	Q757-Q762	Q717-Q724	IC707	Q772-Q774	Q709-Q712	IC703
							Q725-Q731	IC702	Q701-Q707	

0777-0779	IC712	IC713	0788	0750-0756	0886	0887	IC708	0850-0855	0871	0772	0774	0709-0712	IC703	IC702	0701-0707
0765-0771			IC710	0764	0763	IC709		0757-0762		0717-0724					
										0725-0731					

Q780-Q787	Q879	Q878 Q775	IC715	IC714	Q875 Q876	Q794-Q796	Q746 Q745	IC704	Q736
	Q789-Q793	Q860-Q865	IC711		Q856-Q859	Q797-Q802	IC706 Q747-Q749 Q868-Q874	Q737	Q732-Q735
Q777-Q779 IC712	IC713	Q788	Q750-Q756		Q866	Q857 IC708	IC707	Q713-Q716	IC701
Q765-Q771	IC710		Q764 Q763 IC709	Q757-Q762			Q725-Q731	Q709-Q712 IC703	IC702
						Q850-Q854 Q877			Q701-Q707
						Q717-Q724			

Q780 - Q787	Q879	Q878 Q775	IC715	IC714	Q875 Q876	Q794 - Q796	Q746	Q745	IC704	Q736
	Q789 - Q793	Q860 - Q865	IC711	Q866	Q856 - Q859	Q797 - Q802	Q868 - Q874	Q737	Q732 - Q735	
Q777 - Q779 IC712	IC713	Q788	Q750 - Q756	Q866	Q867 IC708	Q850 - Q854 Q877	IC707	Q772 - Q774	Q713 - Q716	IC701
	IC710	Q764 Q763 IC709	Q757 - Q762	Q866	Q867 IC708	Q717 - Q724	Q725 - Q731	Q709 - Q712 IC703	IC702	Q701 - Q707

Q780 - Q787	Q879	Q878 Q775	IC715	IC714	Q875 Q876	Q794 - Q796	Q746	Q745	IC704	Q736
	Q789 - Q793	Q860 - Q865	IC711	Q866	Q856 - Q859	Q797 - Q802	Q868 - Q874	Q737	Q732 - Q735	
Q777 - Q779 IC712	IC713	Q788	Q750 - Q756	Q866	Q867 IC708	Q850 - Q854 Q877	IC707	Q772 - Q774	Q713 - Q716	IC701
	IC710	Q764 Q763 IC709	Q757 - Q762	Q866	Q867 IC708	Q717 - Q724	Q725 - Q731	Q709 - Q712 IC703	IC702	Q701 - Q707

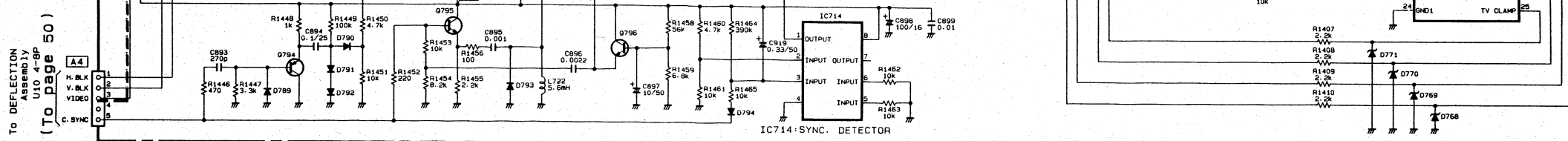
0780-0787	0879	0878 0775	IC715	IC714	0875	0876	0794-0796	0874	0745	0737	IC704	0736	0732-0735
-----------	------	-----------	-------	-------	------	------	-----------	------	------	------	-------	------	-----------

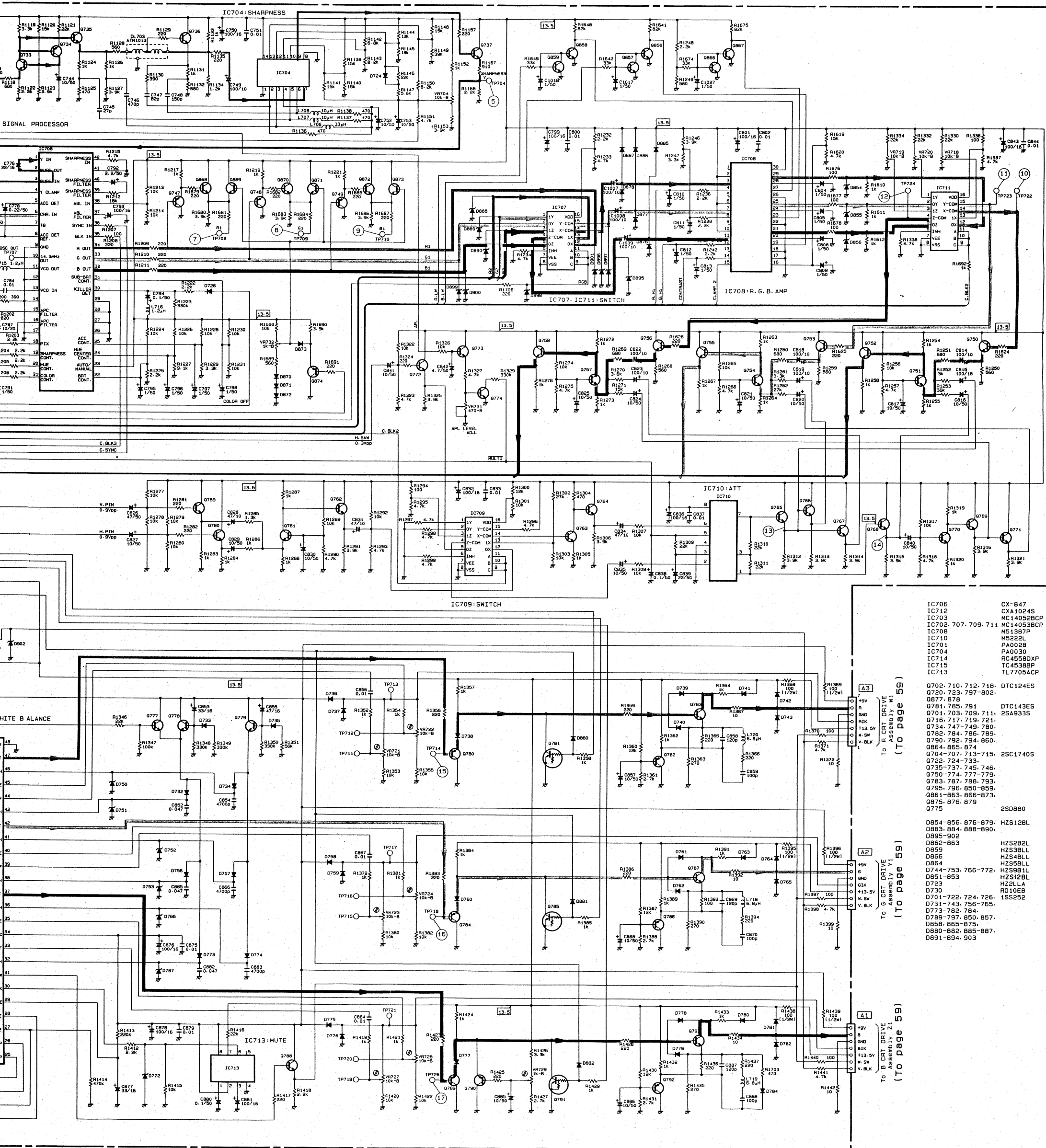
Q780 - Q787	Q879	Q878 Q775	IC715	IC714	Q875 Q876	Q794 - Q796	Q746	Q745	IC704	Q736
	Q789 - Q793	Q860 - Q865	IC711	Q866	Q856 - Q859	Q797 - Q802	Q868 - Q874	Q737	Q732 - Q735	
Q777 - Q779 IC712	IC713	Q788	Q750 - Q756	Q866	Q867 IC708	Q850 - Q854 Q877	IC707	Q772 - Q774	Q713 - Q716	IC701
	IC710	Q764 Q763 IC709	Q757 - Q762	Q866	Q867 IC708	Q717 - Q724	Q725 - Q731	Q709 - Q712 IC703	IC702	Q701 - Q707

45 \_\_\_\_\_ To MICRO-COMPUTER Assembly B9 (To page 40)



—





IC706	CX-847
IC712	CXA1024S
IC703	MC14052B
IC702, 707, 709, 711	MC14053B
IC708	M51387P
IC710	M5222L
IC701	PA0028
IC704	PA0030
IC714	RC4558DX
IC715	TC4538BP
IC713	TL7705AC

Q702. 710. 712. 718. DTC124ES  
Q720. 723. 797-802.  
Q877. 878  
Q701. 765. 791. DTC143ES  
Q701. 703. 709. 711. 2SA933S  
Q716. 717. 719. 721.  
Q734. 747-749. 780.  
Q782. 784. 786. 789.  
Q790. 792. 794. 860.  
Q864. 865. 874  
Q704-707. 713-715. 2SC1740S  
Q722. 724-733.  
Q735-737. 745. 746.  
Q750-744. 777-793.  
Q783. 787. 788. 799.  
Q795. 796. 850-859.  
Q861-863. 866-873.  
Q875. 786. 879  
Q775 2SD880

0854-856. 876-879.	HZS12BL
0883. 884. 888-890.	
0895-902	
0862-863	HZS2B2L
0859	HZS3BL
0866	HZS4BL
0864	HZS5BL
0744-753. 766-772.	HZS8L
0851-853	HZS12BL
0723	
0730	AD10EA
0701-722. 724. 726.	1SS252
0731-743. 756-765.	
0773-782. 784.	
0789-797. 850. 857.	
0858. 865-875.	
0880-882. 885-887.	
0891-894. 903	

to R CAT DRIVE  
Assembly W1  
(To page 59)

TO G CAT DRIVE  
Assembly Y1  
(To page 59)

TO B CAT DRIVE  
Assembly Z1  
(To page 59)

## DEFLECTION Assembly (BWJ1003)

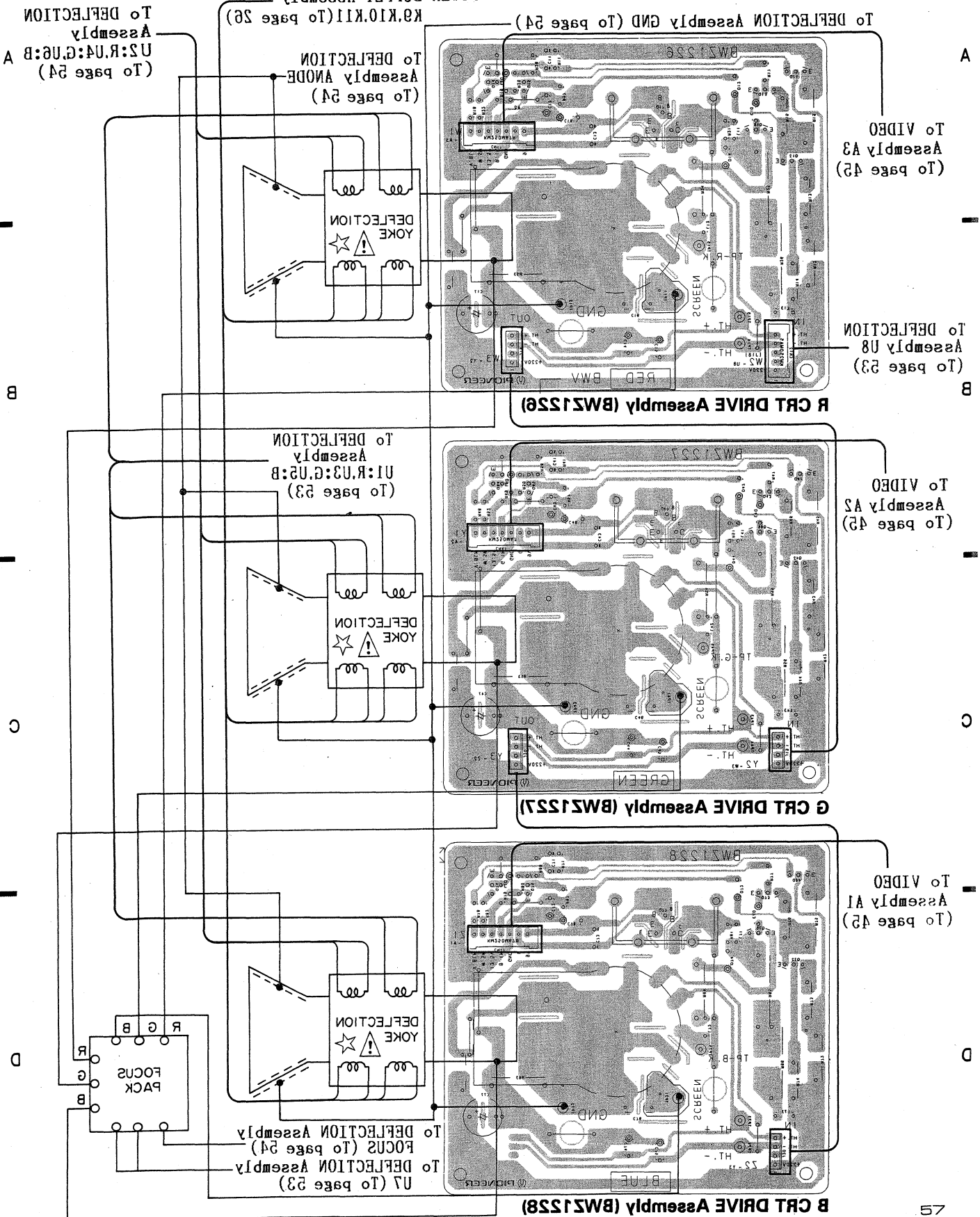








**0.7 R CRT DRIVE (BW1256) G CRT DRIVE (BW1257)  
AND B CRT DRIVE ASSEMBLY (BW1258)**





# 6.7 R CRT DRIVE (BWZ1226), G CRT DRIVE (BWZ1227)

## AND B CRT DRIVE ASSEMBLY (BWZ1228)

To CONVER AMP Assembly and  
POWER SUPPLY Assembly

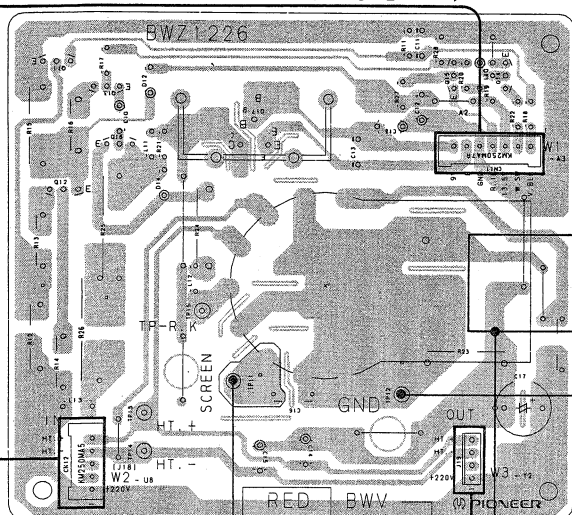
To DEFLECTION Assembly GND (To page 54)

K9.K10.K11(To page 26)

To DEFLECTION  
Assembly  
U2:R.U4:G.U6:B A  
(To page 54)

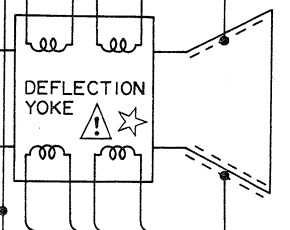
To VIDEO  
Assembly A3  
(To page 45)

To DEFLECTION  
Assembly U8  
(To page 53)

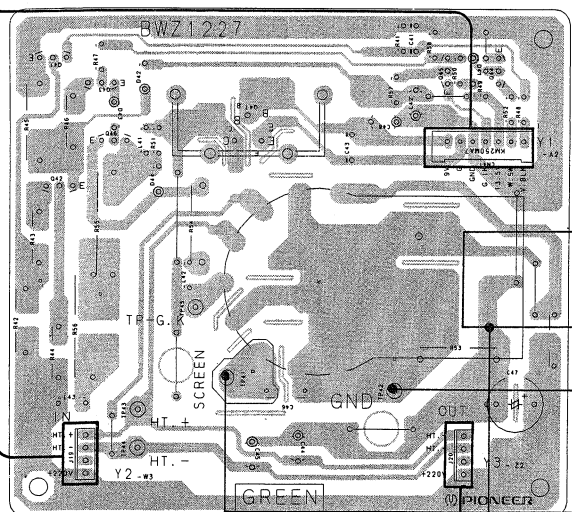


**R CRT DRIVE Assembly (BWZ1226)**

To DEFLECTION  
Assembly ANODE  
(To page 54)

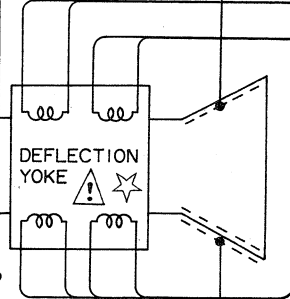


To VIDEO  
Assembly A2  
(To page 45)

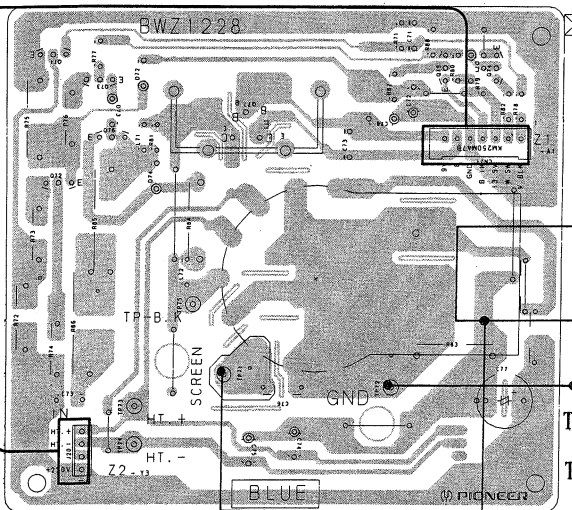


**G CRT DRIVE Assembly (BWZ1227)**

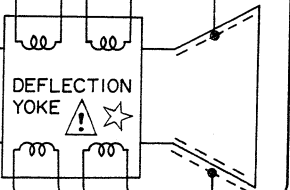
To DEFLECTION  
Assembly  
U1:R.U3:G.U5:B  
(To page 53)



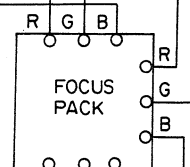
To VIDEO  
Assembly A1  
(To page 45)

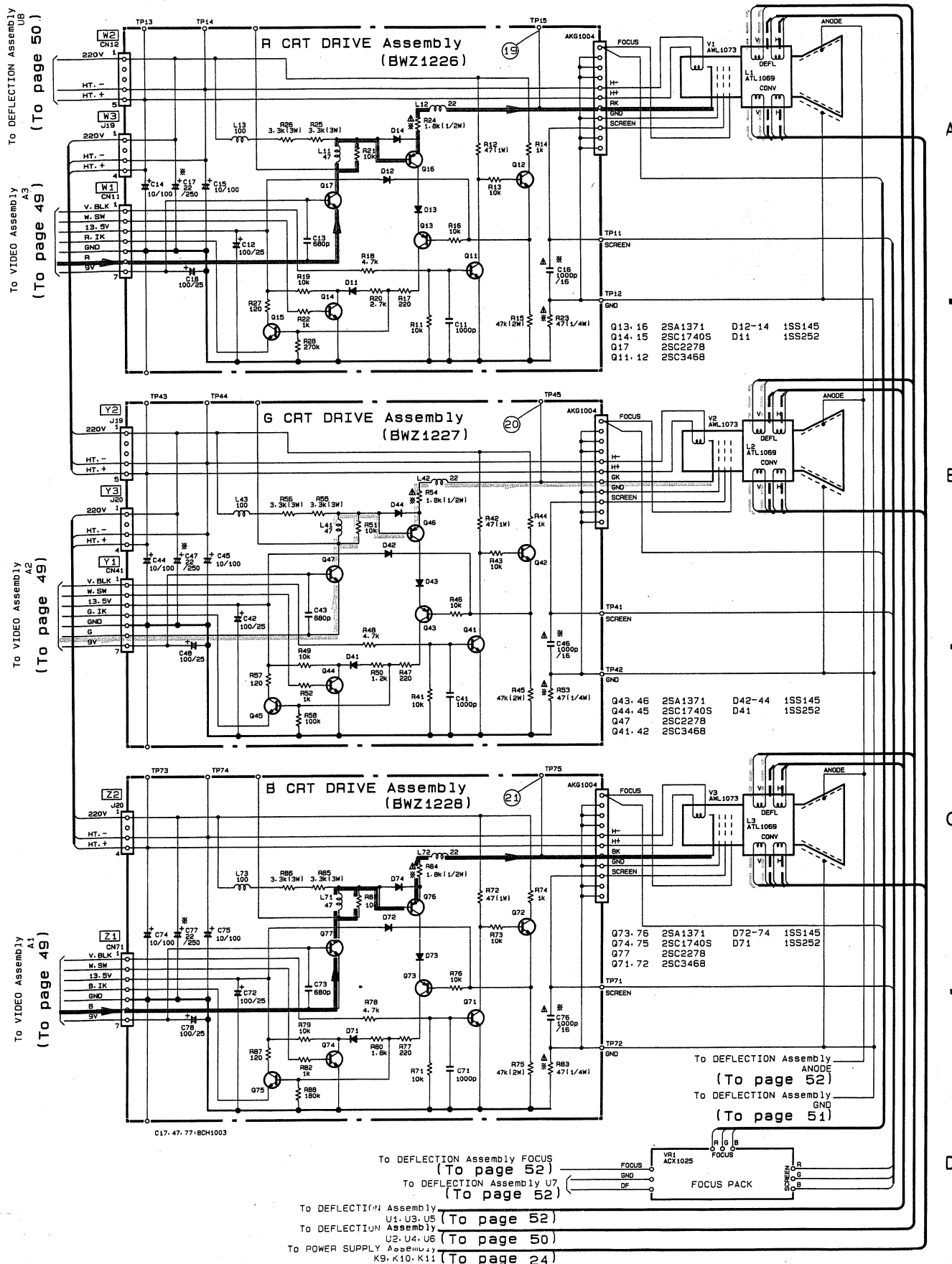


**B CRT DRIVE Assembly (BWZ1228)**



To DEFLECTION Assembly  
FOCUS (To page 54)  
To DEFLECTION Assembly  
U7 (To page 53)





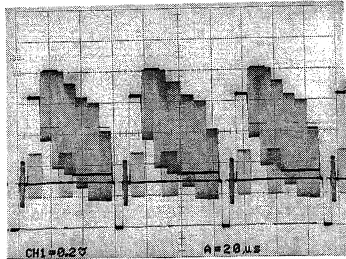
mark shows a high voltage generation point.

- Parts marked by ☆ are important parts which relate with X-ray radiation.
- If any of these parts need to be replaced, always replace with specified parts.

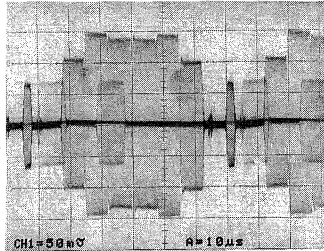


## 6.8 WAVEFORMS OF EACH POSITION

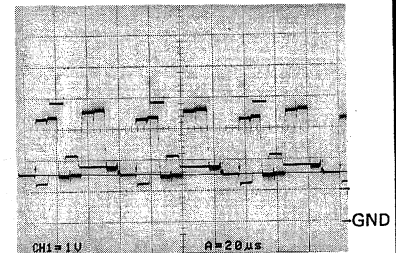
① Q701 Emitter - GND (Video input)  
V : 0.2V H : 20 $\mu$ S Pedestal Level = 6.8V



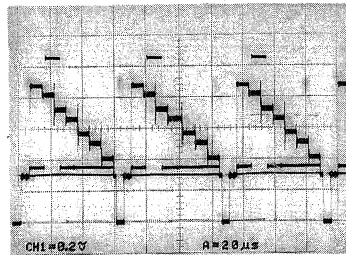
⑥ TP705 (C BPF output)  
V : 50mV H : 10 $\mu$ S  
Burst Level = 140mVp-p



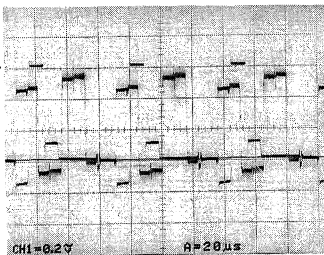
⑩ TP722 (RGB Amp output R)  
V : 1V H : 20 $\mu$ S



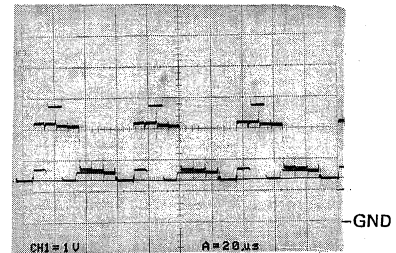
③ TP702 (Comb filter Y output)  
V : 0.2V H : 20 $\mu$ S Pedestal Level = 3.0V



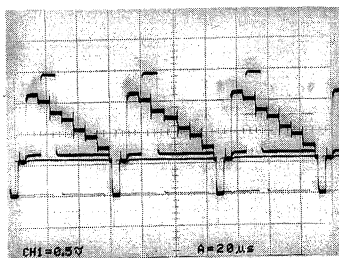
⑦ TP708 (Color Demo output R)  
V : 0.2V H : 20 $\mu$ S Pedestal Level = 2.0V



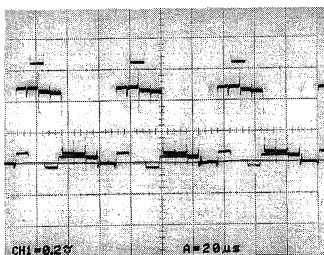
⑪ TP723 (RGB Amp output G)  
V : 1V H : 20 $\mu$ S



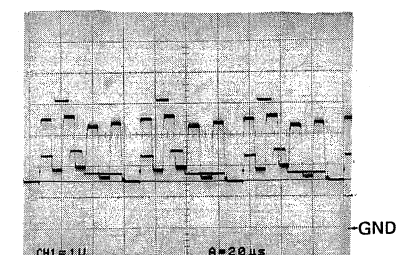
④ TP703 (Sync output)  
V : 0.5V H : 20 $\mu$ S Pedestal Level = 8.6V



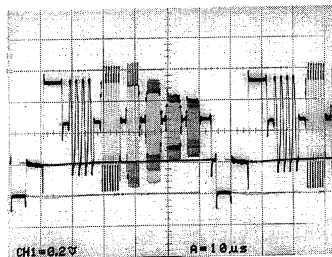
⑧ TP709 (Color Demo output G)  
V : 0.2V H : 20 $\mu$ S Pedestal Level = 2.0V



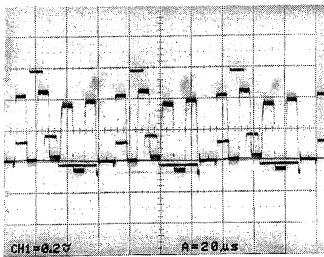
⑫ TP724 (RGB Amp output B)  
V : 1V H : 20 $\mu$ S

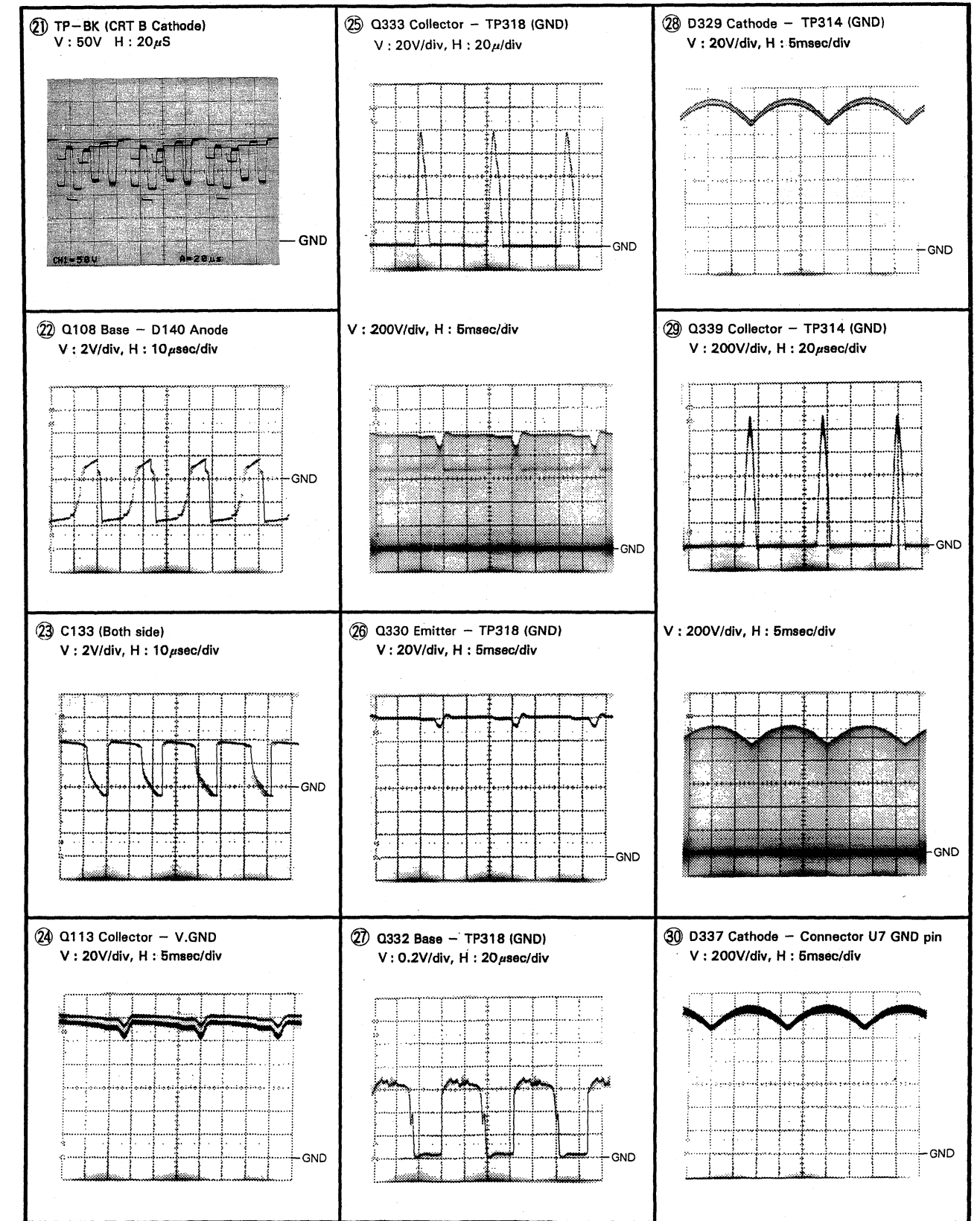
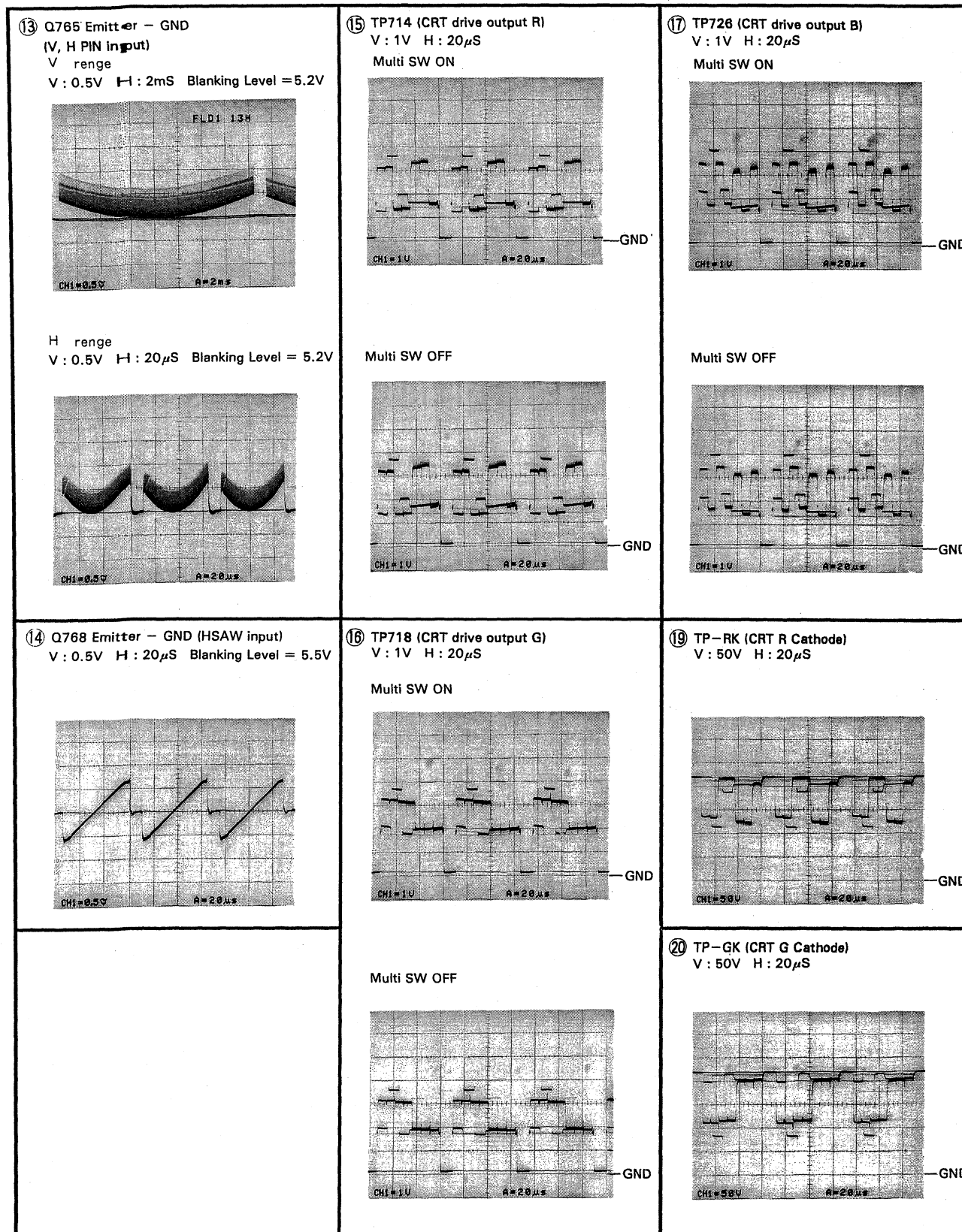


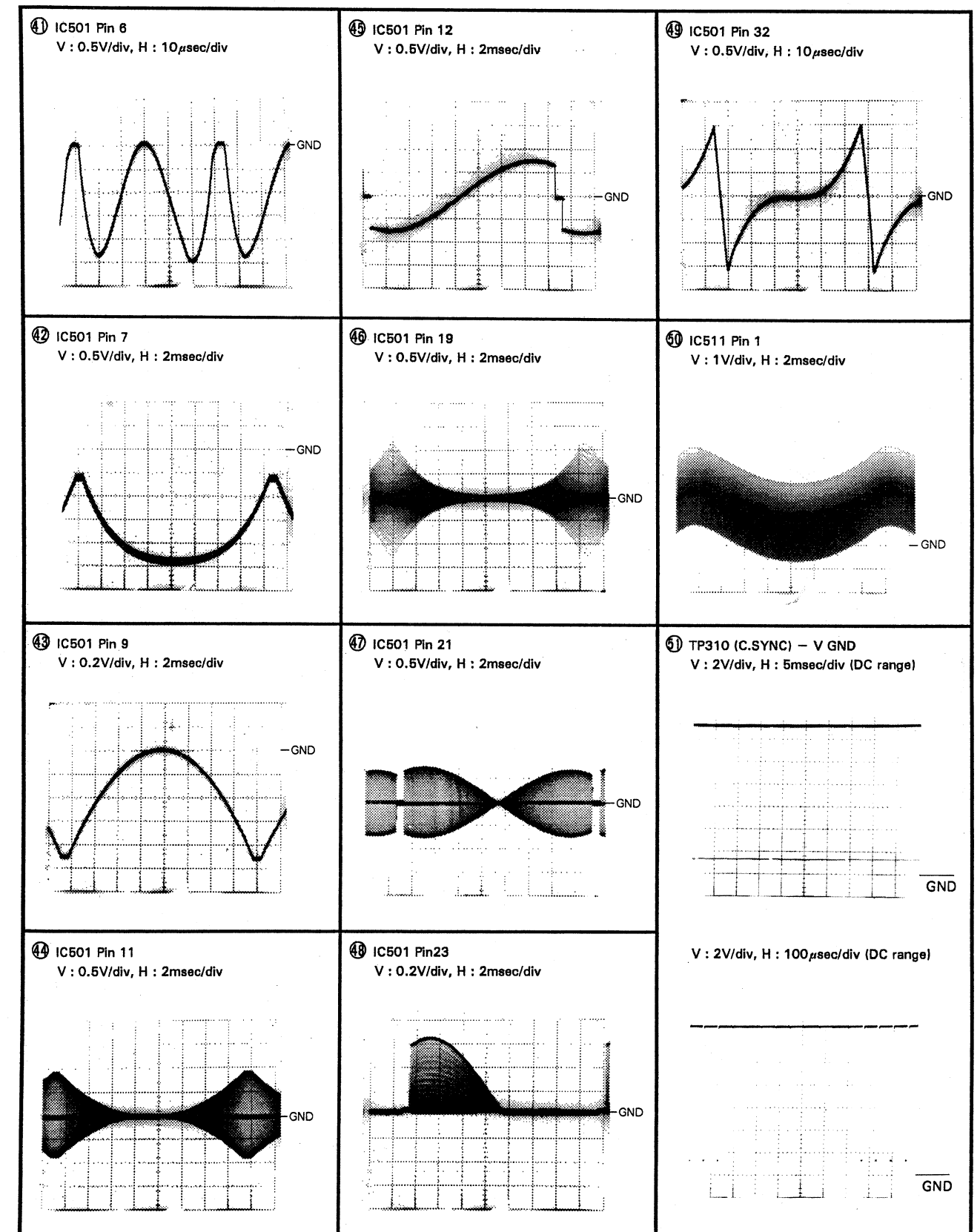
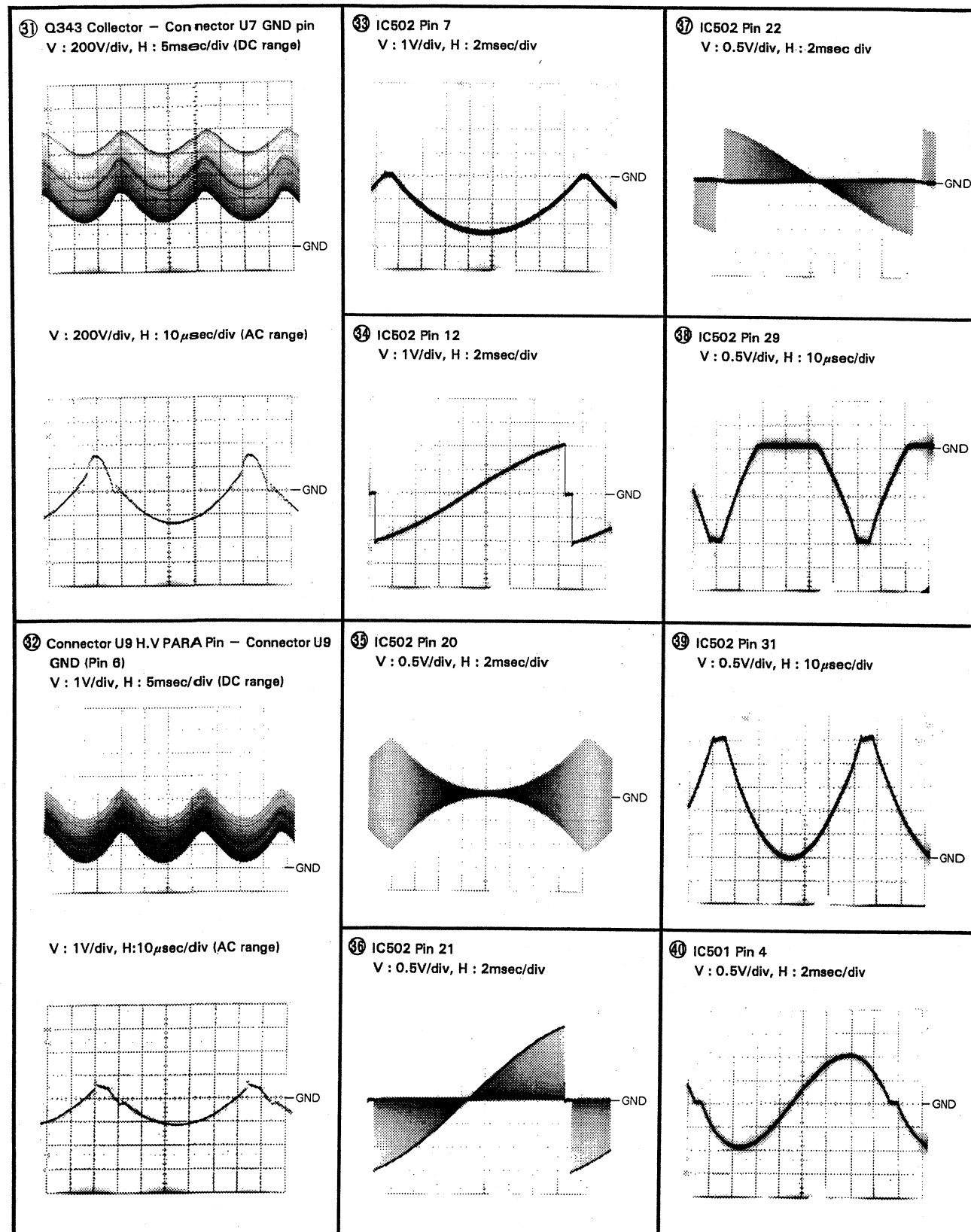
⑤ TP704 (Sharpness output)  
V : 0.2V H : 10 $\mu$ S Pedestal Level = 4.6V

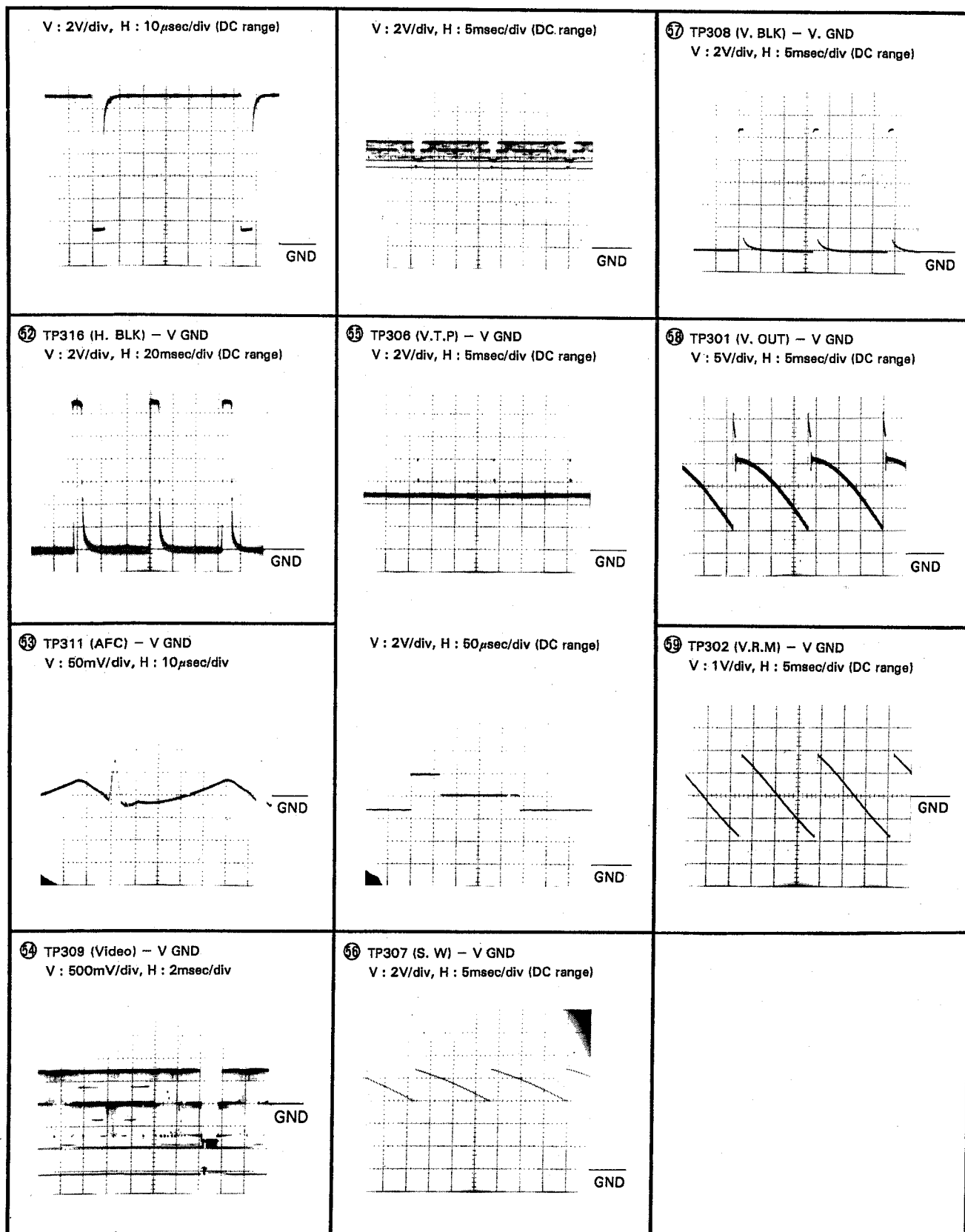


⑨ TP710 (Color Demo output B)  
V : 0.2V H : 20 $\mu$ S Pedestal Level = 2.0V









## 7. PCB 's PARTS LIST

### NOTES:

- Parts without part number cannot be supplied.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560 $\Omega$	$56 \times 10^1$	561.....	RD1/4PS $\square$ $\square$ $\square$ J
47k $\Omega$	$47 \times 10^3$	473.....	RD1/4PS $\square$ $\square$ $\square$ J
0.5 $\Omega$	OR5.....		RN2H $\square$ $\square$ $\square$ K
1 $\Omega$	010.....		RS1P $\square$ $\square$ $\square$ K

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k $\Omega$	$562 \times 10^1$	5621.....	RN1/4SR $\square$ $\square$ $\square$ $\square$ F
----------------	-------------------	-----------	---

Mark No.	Description	Parts No.	Mark No.	Description	Parts No.
<b>DEFLECTION ASSEMBLY (BWJ1003)</b>					
<b>SEMICONDUCTORS</b>					
IC301, 302	OP-AMP IC	RC4558DXP	D302-307	DIODE	1SS252
IC303	TV IC	UPC1377C	D308, 309	ZENER DIODE	HZS6B1L
			D310-313	DIODE	1SS252
Q304	TRANSISTOR	2SD1276A	D314	ZENER DIODE	HZS6B1L
Q305	TRANSISTOR	2SB950A	D315	DIODE	1SS252
Q306	TRANSISTOR	2SC1845			
Q307	TRANSISTOR	2SC1740S	D316	ZENER DIODE	RD5.1ESB2
Q308	TRANSISTOR	2SD438	D317, 318	DIODE	1SS252
			$\Delta$ D319	DIODE	11DF2FD
			$\Delta$ D320, 321	DIODE	ES1F
Q309, 310	TRANSISTOR	2SC1740S	D322	DIODE	RU1
Q311-313	TRANSISTOR	2SA933S			
Q314	TRANSISTOR	2SC1740S	D323	DIODE	1SS252
Q315-318	TRANSISTOR	2SA933S	D324	ZENER DIODE	RD5.1ESB
Q319, 320	TRANSISTOR	2SC1740S	D325	DIODE	1SS252
			D326	ZENER DIODE	RD5.1ESB2
Q321	TRANSISTOR	2SA933S	D327, 328	DIODE	1SS252
Q322, 323	TRANSISTOR	2SC1740S	$\Delta$ D329, 330	DIODE	11E2
Q324, 325	TRANSISTOR	2SA933S	D331-335	DIODE	1SS252
Q326	TRANSISTOR	2SC1740S	D336, 337	DIODE	RP1H
Q327	TRANSISTOR	2SA933S	D338, 339	DIODE	1SS252
			<b>COILS &amp; TRANSFORMERS</b>		
Q328, 329	TRANSISTOR	2SC1740S	L301	INDUCTOR	LTA272J
Q330	TRANSISTOR	2SD1276A	$\Delta$ L302	COIL	ATL1065
Q331	TRANSISTOR	2SC2705	$\Delta$ L303, 304	COIL	ATL1064
Q332	TRANSISTOR	2SC3332	L305, 306	FERRITE BEAD	ATX-028
$\Delta$ Q333	TRANSISTOR	2SD1911(D)			
			$\Delta$ T301	CONVERTER TRANS	ATK1048
Q334	TRANSISTOR	2SC1740S	$\Delta$ T302, 303	H.DRIVE	ATK1045
Q335, 336	TRANSISTOR	2SA933S		TRANSFORMER	
Q337	TRANSISTOR	2SC2705	$\Delta$ T304	DUMMY FBT	ATK1050
$\Delta$ Q338	TRANSISTOR	2SD1276A		TRANSFORMER	
$\Delta$ Q339	TRANSISTOR	2SD1911(D)			
			<b>CAPACITORS</b>		
Q340	TRANSISTOR	2SC1740S	C301	CERAMIC CAPACITOR	CCDSL271J50
Q341	TRANSISTOR	2SA933S	C302	ELECTR.CAPACITOR	CEAS100M50
Q342	TRANSISTOR	2SC3332	C303	ELECTR.CAPACITOR	CEHAQ471M50
$\Delta$ Q343	TRANSISTOR	2SC4257(A)	C304	ELECTR.CAPACITOR	CEAS010M50
Q344	TRANSISTOR	2SC1740S	C305, 306	CERAMIC CAPACITOR	CCCSL101J50
Q345	TRANSISTOR	2SA933S	C307	CERAMIC CAPACITOR	CKCYB102K50
			C308	ELECTROLYTIC	CEHAQ471M25
				CAPACIT	

Mark No.	Description	Parts No.
C309	ELECTROLYTIC CAPACIT	CEHAQ102M25
C310	ELECTR.CAPACITOR	CEAS100M50
C311	ELECTR.CAPACITOR	CEAS2R2M50
C312	ELECTR.CAPACITOR	CEANP2R2M50
C313	ELECTR.CAPACITOR	CEAS470M25
C314	CERAMIC CAPACITOR	CCCSL101J50
C315, 316	ELECTR.CAPACITOR	CEAS010M50
C317	ELECTR.CAPACITOR	CEAS4R7M50
C318, 319	ELECTR.CAPACITOR	CEAS010M50
C320	ELECTR.CAPACITOR	CEAS331M16
C321	ELECTR.CAPACITOR	CEAS010M50
C322	CERAMIC CAPACITOR	CCCSL101J50
C323	ELECTR.CAPACITOR	CEAS010M50
C324	MYLOR FILM CAPACITOR	CQMA104J50
C325	ELECTR.CAPACITOR	CEAS010M50
C326	MYLOR FILM CAPACITOR	CQMA153J50
C327, 328	ELECTR.CAPACITOR	CEAS010M50
C329	CERAMIC CAPACITOR	CKCYB331K50
C330	CERAMIC CAPACITOR	CKDYB103K50
C331	ELECTR.CAPACITOR	CEAS331M16
C332	MYLOR FILM CAPACITOR	CQMA682J50
C333	MYLOR FILM CAPACITOR	CQMA823K50
C334	ELECTR.CAPACITOR	CEAS010M50
C335	CERAMIC CAPACITOR	CKDYB103K50
C336	AUDIO FILM CAPACITOR	CFTXA474J50
C337	MYLOR FILM CAPACITOR	CQMA333J50
C338	MYLOR FILM CAPACITOR	CQMA683J50
C339	CERAMIC CAPACITOR	CKDYF473Z50
C340	MYLOR FILM CAPACITOR	CQMA183J50
C341	CERAMIC CAPACITOR	CKCYX104M25
C342	ELECTR.CAPACITOR	CEAS010M50
C343	ELECTR.CAPACITOR	CEAS100M50
C344	MYLOR FILM CAPACITOR	CQMA223J50
C345	PL.STYRENE CAPACITOR	CQSA562J50
C346	ELECTR.CAPACITOR	CEAS100M50
C347	CERAMIC CAPACITOR	CKDYB103K50
C348	ELECTR.CAPACITOR	CEAS330M16
C349	CERAMIC CAPACITOR	CKDYB103K50
C350	ELECTR.CAPACITOR	CEAS221M16
C351	CERAMIC CAPACITOR	CKDYB103K50
C352	ELE.CAP.(33/160V)	ACH-370
C353	CERAMIC CAPACITOR	CKCYB222K50
C354	ELECTR.CAPACITOR	CEAS101M16
C355	CERAMIC CAPACITOR	CKDYB103K50

Mark No.	Description	Parts No.
C356, 357	CERAMIC CAPACITOR	CKDYF473Z50
C358	MYLOR FILM CAPACITOR	CQMA102J50
C359	ELECTR.CAPACITOR	CEAS010M50
C360	ELECTROLYTIC CAPACIT	CEHAQ010M2C
C361	CERAMIC CAPACITOR	CCDSL101K500
C362	MYLOR FILM CAPACITOR	CQMA102J50
C363	CERAMIC CAPACITOR	CCDSL101K500
C364	ELE.CAP.	ACH1117-A
C365	ELECTROLYTIC CAPACIT	CEHAQ470M2C
C366	CERAMIC CAPACITOR	CKCYF472Z500
C367	ELECTR.CAPACITOR	CEHAQ010M50
C368	CER.CAP.(680P/2KV)	ACG1024
C369	CAPACITOR	CFPHW123H3D
C370	ELECTR.CAPACITOR	CEHAQ100M50
C371	CERAMIC CAPACITOR	CKDYF473Z50
C372	ELECTR.CAPACITOR	CEAS010M50
C373	ELECTR.CAPACITOR	CEAS331M16
C374	ELECTR.CAPACITOR	CEAS470M16
C375	CERAMIC CAPACITOR	CKDYB103K50
C376	ELECTROLYTIC CAPACIT	CEAS221M16
C377	MYLOR FILM CAPACITOR	CQMA473J50
C378	MYLOR FILM CAPACITOR	CQMA103K50
C379	ELECTROLYTIC CAPACIT	CEHAQ010M2C
C380, 381	CERAMIC CAPACITOR	CCDSL101K500
C382	ELE.CAP.(1/160V)	ACH-372
C383	CER.CAP.(680P/2KV)	ACG1024
C384	CAPACITOR	CFPHW123H3D
C385	M.P.P. CAPACITOR	CFPHW683J3A
C386	CERAMIC CAPACITOR	CKDYB391K500
C387	CAPACITOR	CFPMW474J2D
C388, 389	CERAMIC CAPACITOR	CKDYB391K500
C390	MYLOR FILM CAPACITOR	CQMA103K250
C391	MYLOR FILM CAPACITOR	CQMA223J50
C392	CERAMIC CAPACITOR	CKCYB102K500
C393	ELECTR.CAPACITOR	CEHAQ010M50
C394	ELECTR.CAPACITOR	CEANP4R7M35
C395	ELECTROLYTIC CAPACIT	CEHAQ220M50
C396, 397	CER.CAP.(4700P/2KV)	ACG-035
C398	MYLOR FILM CAPACITOR	CQMA183J50
C399, 400	ELECTR.CAPACITOR	CEAS101M25
TH301	THERMISTOR	TH101-2



Mark No.	Description	Parts No.	Mark No.	Description	Parts No.
<b>RESISTORS</b>					
VR301	VR	VRTB6VS221	△ R449	METALFILM RESISTER	RN1/2PC3902F
VR302	VR	VRTS6VS472	△ R450	METALFILM RESISTER	RN1/2PC3602F
VR303	VR	VRTS6VS102	R451	RESISTOR(47, 1/2W)	ACN-225
VR304	VR	VRTS6VS472	R455	CARBON FILM RESISTOR	RD1/4PMFL682J
VR305	VR	VRTS6VS223	R457	CARBON FILM RESISTOR	RD1/2PM153J
VR306	VR	VRTS6VS102			
VR307	VR	VRTB6VS222			
R301	METAL OXIDE RESISTOR	RS2LMF2R2J	R459	CARBON FILM RESISTOR	RD1/4PMFL471J
R310, 311	METAL OXIDE RESISTOR	RS2LMF010J	R460	CARBONFILM RESISTOR	RD1/2PM473J
R315	METAL OXIDE RESISTOR	RS2LMF010J	R461	METAL OXIDE RESISTOR	RS2PMF1R5J
R332, 333	METALFILM RESISTOR	RN1/4PQ2201F	R462	CARBONFILM RESISTOR	RD1/2PM152J
R383	METAL OXIDE RESISTOR	RS2LMF561J	R463, 464	CARBON FILM RESISTOR	RD1/2PM272J
△ R408	CARBON FILM RESISTOR	RD1/4PMFL3R9J	R471	CARBON FILM RESISTOR	RD1/2PMFL103J
△ R409	CARBON FILM RESISTOR	RD1/4PMFL470J	△ R475	CARBONFILM RESISTOR	RD1/2PMFL102J
R410	METALFILM RESISTER	RN1/4PC7502F	R476	CARBONFILM RESISTOR	RD1/2PM122J
R411	METALFILM RESISTER	RN1/4PC1003F	△ R478-487	METAL OXIDE RESISTOR	RS1LMF623J
R414	CARBON FILM RESISTOR	RD1/2PM821J	R488-490	RESISTOR(100K, 1/2W)	ACN1074
R416	METALFILM RESISTER	RN1/4PC1001F	R491	CARBON FILM RESISTOR	RD1/4PM221J
R417	METALFILM RESISTER	RN1/4PC1502F	R493	CARBON FILM RESISTOR	RD1/4PM241J
R420	METALFILM RESISTER	RN1/4PC1002F	R494	METALFILM RESISTER	RN1/2PC6800F
R421	CARBON FILM RESISTOR	RD1/2PMFL472J	R495	METALFILM RESISTER	RN1/4PC1002F
R422	CARBONFILM RESISTOR	RD1/2PM471J	R496	METALFILM RESISTER	RN1/4PC3301F
R423	METAL OXIDE RESISTOR	RS3PMF512J	R499	CARBON FILM RESISTOR	RD1/4PMFL101J
R424	CARBON FILM RESISTOR	RD1/4PM162J	R500-502	CARBON FILM RESISTOR	RD1/2PM560J
R425	CARBON FILM RESISTOR	RD1/4PMFL471J	R505	METALFILM RESISTER	RN1/4PC2201F
R427	METAL OXIDE RESISTOR	RS2PMFR47J	R507	METALFILM RESISTER	RN1/4PC3002F
R428	METAL OXIDE RESISTOR	RS2PMF220J		Other resistors	RD1/8PM□□□J
R431	CARBON FILM RESISTOR	RD1/2PM222J	<b>OTHERS</b>		
△ R432	CARBON FILM RESISTOR	RD1/4PMFL100J	△ CN301, 303	PLUG 4-P	AKM1066
△ R433	CARBON FILM RESISTOR	RD1/4PMFL2R2J	△ CN305	PLUG 4-P	AKM1066
R440	CARBON FILM RESISTOR	RD1/4PM821J		SCREW	ABA-234
△ R441	CARBON FILM RESISTOR	RD1/4PMFL3R9J		SCREW	BBZ30P080FCU
				SCREW	PBZ30P080FMC
				SCREW	VPZ40P100FMC

Mark No.	Description	Parts No.	Mark No.	Description	Parts No.
<b>VIDEO ASSEMBLY (BWQ1003)</b>					
<b>SEMICONDUCTORS</b>					
IC701	TV IC	PA0028	Q795, 796	TRANSISTOR	2SC1740S
IC702	LOGIC IC	MC14053BCP	Q797-802	TRANSISTOR	DTC124ES
IC703	LOGIC IC	MC14052BCP	Q850-859	TRANSISTOR	2SC1740S
IC704	TV IC	PA0030			
IC706	TV IC	CX-847	Q860	TRANSISTOR	2SA933S
			Q861-863	TRANSISTOR	2SC1740S
IC707	LOGIC IC	MC14053BCP	Q864, 865	TRANSISTOR	2SA933S
IC708	3CH VIDEO AMP	M51387P	Q866-873	TRANSISTOR	2SC1740S
IC709	LOGIC IC	MC14053BCP	Q874	TRANSISTOR	2SA933S
IC710	E-VR IC	M5222L			
IC711	LOGIC IC	MC14053BCP	Q875, 876	TRANSISTOR	2SC1740S
IC712	TV IC	CXA1024S	Q877, 878	TRANSISTOR	DTC124ES
			Q879	TRANSISTOR	2SC1740S
IC713	IC	TL7705ACP			
IC714	OP-AMP IC	RC4558DXP	D701-722	DIODE	1SS252
IC715	LOGIC IC	TC4538BP	D723	ZENER DIODE	HZ2LLA
			D724, 726	DIODE	1SS252
Q701	TRANSISTOR	2SA933S	D730	ZENER DIODE	RD10EB
Q702	TRANSISTOR	DTC124ES	D731-743	DIODE	1SS252
Q703	TRANSISTOR	2SA933S			
Q704-707	TRANSISTOR	2SC1740S	D744-753	ZENER DIODE	HZS9B1L
Q709	TRANSISTOR	2SA933S	D756-765	DIODE	1SS252
			D766-772	ZENER DIODE	HZS9B1L
Q710	TRANSISTOR	DTC124ES	D773-782	DIODE	1SS252
Q711	TRANSISTOR	2SA933S	D784	DIODE	1SS252
Q712	TRANSISTOR	DTC124ES			
Q713-715	TRANSISTOR	2SC1740S	D789-797	DIODE	1SS252
Q716, 717	TRANSISTOR	2SA933S	D850	DIODE	1SS252
			D851-853	ZENER DIODE	HZS9B1L
Q718	TRANSISTOR	DTC124ES	D854-856	ZENER DIODE	HZS12BL
Q719	TRANSISTOR	2SA933S	D857, 858	DIODE	1SS252
Q720	TRANSISTOR	DTC124ES			
Q721	TRANSISTOR	2SA933S	D859	ZENER DIODE	HZS3BLL
Q722	TRANSISTOR	2SC1740S	D862, 863	ZENER DIODE	HZS2BLL
			D864	ZENER DIODE	HZS5BLL
Q723	TRANSISTOR	DTC124ES	D865	DIODE	1SS252
Q724-733	TRANSISTOR	2SC1740S	D866	ZENER DIODE	HZS4BLL
Q734	TRANSISTOR	2SA933S			
Q735-737	TRANSISTOR	2SC1740S	D867-875	DIODE	1SS252
Q745, 746	TRANSISTOR	2SC1740S	D876-879	ZENER DIODE	HZS12BL
			D880-882	DIODE	1SS252
Q747-749	TRANSISTOR	2SA933S	D883, 884	ZENER DIODE	HZS12BL
Q750-774	TRANSISTOR	2SC1740S	D885-887	DIODE	1SS252
Q775	TRANSISTOR	2SD880			
Q777-779	TRANSISTOR	2SC1740S	D888-890	ZENER DIODE	HZS12BL
Q780	TRANSISTOR	2SA933S	D891-894	DIODE	1SS252
			D895-902	ZENER DIODE	HZS12BL
Q781	TRANSISTOR	DTC143ES	D903	DIODE	1SS252
Q782	TRANSISTOR	2SA933S			
Q783	TRANSISTOR	2SC1740S	DL701	FILTER	ATN1001
Q784	TRANSISTOR	2SA933S	DL702	DELAY LINE	ATN1018
Q785	TRANSISTOR	DTC143ES	DL703	DELAY LINE	ATN1013
Q786	TRANSISTOR	2SA933S	<b>SWITCH</b>		
Q787, 788	TRANSISTOR	2SC1740S	S701	SWITCH	ASH1015
Q789, 790	TRANSISTOR	2SA933S			
Q791	TRANSISTOR	DTC143ES	<b>COILS</b>		
Q792	TRANSISTOR	2SA933S	L701	AXIAL INDUCTOR	LAU101K
			L702	AXIAL INDUCTOR	LAU220K
Q793	TRANSISTOR	2SC1740S	L703	AXIAL INDUCTOR	LAU150K
Q794	TRANSISTOR	2SA933S	L704	COIL	ATG1006
			L705	AXIAL INDUCTOR	LAU101K



Mark No.	Description	Parts No.
L706	AXIAL INDUCTOR	LAU330K
L707, 708	AXIAL INDUCTOR	LAU100K
L712	AXIAL INDUCTOR	LAU270K
L713	AXIAL INDUCTOR	LAU100K
L714-716	AXIAL INDUCTOR	LAU1R2M
L718-720	AXIAL INDUCTOR	LAU6R8K
L722	INDUCTOR	LTA562J

**CAPACITORS**

C1000	ELECTR.CAPACITOR	CEAS100M50
C1001	CERAMIC CAPACITOR	CKDYF103Z50
C1002	ELECTR.CAPACITOR	CEAS100M50
C1004-1006	ELECTR.CAPACITOR	CEAS100M50
C1007-1009	ELECTR.CAPACITOR	CEAS101M10
C1010-1012	ELECTR.CAPACITOR	CEASR22M50
C1013	MYLOR FILM CAPACITOR	CQMA473J50
C1014-1023	ELECTR.CAPACITOR	CEAS010M50
C1024	ELECTR.CAPACITOR	CEANP100M16
C1025	ELECTR.CAPACITOR	CEAS010M50
C1026	CERAMIC CAPACITOR	CKDYF103Z50
C1027	ELECTR.CAPACITOR	CEAS010M50
C701	ELECTR.CAPACITOR	CEAS101M10
C702, 703	CERAMIC CAPACITOR	CCDSL470J50
C704, 705	CERAMIC CAPACITOR	CKDYF103Z50
C706	CERAMIC CAPACITOR	CCDSL101J50
C707, 708	CERAMIC CAPACITOR	CKDYF103Z50
C709	ELECTR.CAPACITOR	CEAS101M10
C711	ELECTR.CAPACITOR	CEASR47M50
C712	ELECTR.CAPACITOR	CEAS470M16
C713	CERAMIC CAPACITOR	CCCSL060D50
C714	MYLOR FILM CAPACITOR	CQMA154J50
C715	MYLOR FILM CAPACITOR	CQMA152J50
C716	ELECTR.CAPACITOR	CEAS100M50
C717	CERAMIC CAPACITOR	CKDYF103Z50
C718	ELECTR.CAPACITOR	CEAS101M16
C719	CERAMIC CAPACITOR	CCDSL390J50
C720	ELECTR.CAPACITOR	CEAS101M10
C721	CERAMIC CAPACITOR	CKDYF103Z50
C722	ELECTR.CAPACITOR	CEAS101M10
C723	ELECTR.CAPACITOR	CEAS101M16
C724	CERAMIC CAPACITOR	CKDYF103Z50
C725	ELECTR.CAPACITOR	CEAS101M16
C726	CERAMIC CAPACITOR	CKDYF103Z50
C727	ELECTR.CAPACITOR	CEAS101M10
C728	ELECTR.CAPACITOR	CEASR47M50
C729	ELECTR.CAPACITOR	CEAS100M50
C730-735	ELECTR.CAPACITOR	CEAS101M10
C736	ELECTR.CAPACITOR	CEAS100M50
C737, 738	ELECTR.CAPACITOR	CEAS101M10
C739	ELECTR.CAPACITOR	CEAS100M50
C740, 741	ELECTR.CAPACITOR	CEAS101M10

C742	CERAMIC CAPACITOR	CCDSL150J50
C743	ELECTR.CAPACITOR	CEAS221M10
C744	ELECTR.CAPACITOR	CEAS100M50
C745	CERAMIC CAPACITOR	CCDSL270J50
C746	CERAMIC CAPACITOR	CKCYB471K50
C747	CERAMIC CAPACITOR	CCDSL820J50
C748	CERAMIC CAPACITOR	CCDSL151J50
C749	ELECTR.CAPACITOR	CEAS101M10
C750	ELECTR.CAPACITOR	CEAS101M16
C751	CERAMIC CAPACITOR	CKDYF103Z50
C752, 753	ELECTR.CAPACITOR	CEAS100M50
C770	CERAMIC CAPACITOR	CKDYF103Z50
C771	CERAMIC CAPACITOR	CCDSL390J50
C772	CERAMIC CAPACITOR	CKDYF103Z50
C773	CERAMIC CAPACITOR	CCDSL470J50
C774	CERAMIC CAPACITOR	CCDSL181J50
C775	CERAMIC CAPACITOR	CKDYF103Z50
C776	ELECTR.CAPACITOR	CEAS220M16
C777	CERAMIC CAPACITOR	CKCYB472K50
C778	ELECTR.CAPACITOR	CEASR22M50
C779	ELECTR.CAPACITOR	CEAS101M16
C780	CERAMIC CAPACITOR	CKDYF103Z50
C781	ELECTR.CAPACITOR	CEASR22M50
C782	CERAMIC CAPACITOR	CCDUJ150J50
C783	CERAMIC CAPACITOR	CCDUJ080D50
C784	CERAMIC CAPACITOR	CKDYF103Z50
C785, 786	ELECTR.CAPACITOR	CEASR47M50
C787	ELECTR.CAPACITOR	CEAS100M25
C788-791	ELECTR.CAPACITOR	CEAS010M50
C792	ELECTR.CAPACITOR	CEAS2R2M50
C793	ELECTR.CAPACITOR	CEAS101M16
C794	ELECTR.CAPACITOR	CEAS0R1M50
C795-798	ELECTR.CAPACITOR	CEAS010M50
C799	ELECTR.CAPACITOR	CEAS101M16
C800	CERAMIC CAPACITOR	CKDYF103Z50
C801	ELECTR.CAPACITOR	CEAS101M16
C802	CERAMIC CAPACITOR	CKDYF103Z50
C804-806	ELECTR.CAPACITOR	CEAS010M50
C809-813	ELECTR.CAPACITOR	CEAS010M50
C814	ELECTROLYTIC CAPACIT	CEANP101M10
C815	ELECTR.CAPACITOR	CEAS101M16
C816, 817	ELECTR.CAPACITOR	CEAS100M50
C818	ELECTROLYTIC CAPACIT	CEANP101M10
C819	ELECTR.CAPACITOR	CEAS101M10
C820, 821	ELECTR.CAPACITOR	CEAS100M50
C822	ELECTROLYTIC CAPACIT	CEANP101M10
C823	ELECTR.CAPACITOR	CEAS101M10
C824, 825	ELECTR.CAPACITOR	CEAS100M50
C826	ELECTR.CAPACITOR	CEAS470M50
C827	ELECTR.CAPACITOR	CEAS100M50
C828	ELECTR.CAPACITOR	CEAS470M10

Mark No.	Description	Parts No.	Mark No.	Description	Parts No.
C829, 830	ELECTR.CAPACITOR	CEAS100M50	C891	ELECTR.CAPACITOR	CEAS101M25
C831	ELECTR.CAPACITOR	CEAS470M10	C892	CERAMIC CAPACITOR	CKDYF103Z50
C832	ELECTR.CAPACITOR	CEAS101M16	C893	CERAMIC CAPACITOR	CCDSL271J50
C833	CERAMIC CAPACITOR	CKDYF103Z50	C894	CERAMIC CAPACITOR	CKCYX104M25
C834	ELECTR.CAPACITOR	CEAS470M10	C895	MYLOR FILM	CQMA102J50
C835	ELECTR.CAPACITOR	CEAS100M50		CAPACITOR	
C836	ELECTR.CAPACITOR	CEAS101M16	C896	MYLOR FILM	CQMA222J50
C837	CERAMIC CAPACITOR	CKDYF103Z50		CAPACITOR	
C838	ELECTR.CAPACITOR	CEAS0R1M50	C897	ELECTR.CAPACITOR	CEAS100M50
C839	ELECTR.CAPACITOR	CEAS220M50	C898	ELECTR.CAPACITOR	CEAS101M16
C840, 841	ELECTR.CAPACITOR	CEAS100M50	C899	CERAMIC CAPACITOR	CKDYF103Z50
C842	ELECTR.CAPACITOR	CEAS47M50	C919	ELECTR.CAPACITOR	CEASR33M50
C843	ELECTR.CAPACITOR	CEAS101M16	C920	MYLOR FILM	CQMA683J50
C844	CERAMIC CAPACITOR	CKDYF103Z50		CAPACITOR	
C848	ELECTR.CAPACITOR	CEAS100M50	C921	ELECTR.CAPACITOR	CEAS101M16
C849	ELECTR.CAPACITOR	CEAS101M16	C922	CERAMIC CAPACITOR	CKDYF103Z50
C850	CERAMIC CAPACITOR	CKDYF103Z50	C923	CERAMIC CAPACITOR	CCDSL101J50
C852	MYLOR FILM	CQMA473J50	C1028	CERAMIC CAPACITOR	CKDYF103Z50
	CAPACITOR		TC701	CERAMIC TRIMMER	ACM-026
C853	ELECTR.CAPACITOR	CEAS330M16	<b>RESISTORS</b>		
C854	MYLOR FILM	CQMA472J50	VR701	VR	ACP1022
	CAPACITOR		VR702, 703	VR	ACP1029
C855	ELECTR.CAPACITOR	CEAS470M16	VR704	VR (10k)	ACP1025
C856	MYLOR FILM	CQMA103J50	VR718-724	VR (10k)	ACP1025
	CAPACITOR		VR727, 728	VR (10k)	ACP1025
C857	ELECTR.CAPACITOR	CEAS100M50	VR729	VR	ACP1022
C858	CERAMIC CAPACITOR	CCDSL121J50	VR730	VR (10k)	ACP1025
C859	CERAMIC CAPACITOR	CCDSL101J50	VR731	VR	ACP1034
C860, 861	CERAMIC CAPACITOR	CKDYF103Z50	VR732	VR	ACP1022
C862-864	ELECTR.CAPACITOR	CEANP100M16	R1368, 1369	CARBONFILM	RD1/2PM101J
				RESISTOR	
C865	MYLOR FILM	CQMA473J50	R1395, 1396	CARBONFILM	RD1/2PM101J
	CAPACITOR			RESISTOR	
C866	MYLOR FILM	CQMA472J50	R1438, 1439	CARBONFILM	RD1/2PM101J
	CAPACITOR			RESISTOR	
C867	MYLOR FILM	CQMA103J50		Other resistors	RD1/8PM□□□J
	CAPACITOR		<b>OTHERS</b>		
C868	ELECTR.CAPACITOR	CEAS100M50		BNC CONNECTOR	AKX1002
C869	CERAMIC CAPACITOR	CCDSL121J50		SOCKET	
C870	CERAMIC CAPACITOR	CCDSL101J50		9P D-SUB SOCKET	BKP1018
C874	ELECTR.CAPACITOR	CEAS100M25	X701	CRYSTAL	BSS1013
C875	CERAMIC CAPACITOR	CKDYF103Z50		RESONATOR	
C876	ELECTR.CAPACITOR	CEAS101M16		SCREW	VMZ30P080FMC
C877	ELECTR.CAPACITOR	CEAS330M16			
C878	ELECTR.CAPACITOR	CEAS101M16			
C879	CERAMIC CAPACITOR	CKDYF103Z50			
C880	ELECTR.CAPACITOR	CEAS0R1M50			
C881	ELECTR.CAPACITOR	CEAS101M16			
C882	MYLOR FILM	CQMA473J50			
	CAPACITOR				
C883	MYLOR FILM	CQMA472J50			
	CAPACITOR				
C884	MYLOR FILM	CQMA103J50			
	CAPACITOR				
C885, 886	ELECTR.CAPACITOR	CEAS100M50			
C887	CERAMIC CAPACITOR	CCDSL121J50			
C888	CERAMIC CAPACITOR	CCDSL101J50			

Mark No.	Description	Parts No.
----------	-------------	-----------

**POWER SUPPLY/CONVER AMP ASSEMBLY (BWZ1224)**
**CONVER AMP BLOCK**
**SEMICONDUCTORS**

IC901	REGULATOR IC	M5F78M12L
IC902	REGULATOR IC	UPC78M05H
IC903	REGULATOR IC	M5F79M12L
IC904	REGULATOR IC	NJM79M05FA
IC905, 906	TV HIC	STK4278

Q901	TRANSISTOR	2SA933S
Q902, 903	TRANSISTOR	2SC1740S
Q904	TRANSISTOR	2SC3377
Q905	TRANSISTOR	2SA1515
Q906	TRANSISTOR	2SD1276A

Q907	TRANSISTOR	2SB950A
Q908	TRANSISTOR	2SB560
Q909	TRANSISTOR	2SD438

D901-904	DIODE	1SS252
D905, 906	ZENER DIODE	RD6.2ESB
D907-912	DIODE	1SS252
D913, 914	DIODE	11DF2FD
D915, 916	DIODE	11E2

**CAPACITORS**

C951, 954	ELECTROLYTIC CAPACIT	CEHAQR47M50
-----------	----------------------	-------------

C955	ELECTR.CAPACITOR	CEHAQ010M50
C956	ELECTR.CAPACITOR	CEHAQ100M50
C957	ELECTROLYTIC CAPACIT	CEHAQ101M10

C958	ELECTR.CAPACITOR	CEHAQ010M50
------	------------------	-------------

C959	CERAMIC CAPACITOR	CKCYF103Z50
C960	ELECTROLYTIC CAPACIT	CEHAQR47M50

C961	ELECTR.CAPACITOR	CEHAQ100M50
C962	ELECTR.CAPACITOR	CEHAQ010M50
C963	ELECTROLYTIC CAPACIT	CEHAQR47M50

C964	ELECTR.CAPACITOR	CEHAQ010M50
C965	ELECTR.CAPACITOR	CEHAQ100M50
C966	CERAMIC CAPACITOR	CKCYF103Z50
C967	ELECTR.CAPACITOR	CEHAQ100M50
C968	CERAMIC CAPACITOR	CKCYF103Z50

C969, 970	ELECTR.CAPACITOR	CEHAQ221M35
C971-974	CERAMIC CAPACITOR	CKCYF103Z50
C975, 976	CERAMIC CAPACITOR	CKCYX473M25
C977	ELECTR.CAPACITOR	CEHAQ221M35
C978, 979	ELECTROLYTIC CAPACIT	CEHAQ471M35

C980	ELECTR.CAPACITOR	CEHAQ221M35
C981-984	ELECTR.CAPACITOR	CEHAQ100M50
C985-988	CERAMIC CAPACITOR	CKCYF103Z50

Mark No.	Description	Parts No.
----------	-------------	-----------

**RESISTORS**

R901	METAL OXIDE RESISTOR	RS3LMF180J
R902	CARBON FILM RESISTOR	RD1/4PMFL100J
R904	CARBON FILM RESISTOR	RD1/2PMFL220J
R905-907	CARBON FILM RESISTOR	RD1/4PMFL100J
R912	METAL OXIDE RESISTOR	RS3LMF180J

R916, 917	RESISTOR (330, 5W)	RT7PD3R9K
R919	CARBON FILM RESISTOR	RD1/2PMFL220J

R927	RESISTOR (330, 5W)	RT5PD470K
R947-952	CARBONFILM RESISTOR	RD1/2PM682J

R953-958	METAL OXIDE RESISTOR	RS2LMF3R3J
----------	----------------------	------------

R959-964	CARBON FILM RESISTOR	RD1/4PMFL271J
----------	----------------------	---------------

R967, 968	CARBON FILM RESISTOR	RD1/2PM3R9J
-----------	----------------------	-------------

Other resistors		RD1/8PM□□□J
-----------------	--	-------------

**OTHERS**

SCREW (M3x6)	ABA1056
SCREW	BBZ30P080FCU
SCREW	VBZ30P080FMC

**POWER SUPPLY BLOCK**
**SEMICONDUCTORS**

IC101, 102	REGULATOR IC	UPC78M12H
IC103	REGULATOR IC	UPC78M05H
△ IC104, 105	PHOTOCOUPLER	PC111S

Q101	TRANSISTOR	2SA933S
Q102-104	TRANSISTOR	2SC1740S
Q105	TRANSISTOR	DTC124ES
Q106	TRANSISTOR	2SA933S
Q107	TRANSISTOR	2SC1740S

△ Q108	TRANSISTOR	2SC4109
Q109	TRANSISTOR	2SA933S
Q110	TRANSISTOR	2SB824
Q111	TRANSISTOR	2SC3332
Q112	TRANSISTOR	2SA933S

Q113	TRANSISTOR	2SC2705
Q114	TRANSISTOR	2SA933S
Q115	TRANSISTOR	2SD1275
Q116, 117	TRANSISTOR	2SA933S
Q118	TRANSISTOR	2SD1275

Q119-121	TRANSISTOR	2SC1740S
----------	------------	----------

Mark No.	Description	Parts No.
D101	DIODE	1SS145
D102	ZENER DIODE	HZS5BLL
D103-106	DIODE	1SS145
D107-113	DIODE	1SS252
D114	ZENER DIODE	HZS6B1L
D115-117	DIODE	1SS252
D118	DIODE	11DF1FD
D119	DIODE	1SS252
D120	DIODE	11DF1FD
D121-126	DIODE	1SS252
D127	ZENER DIODE	HZS6C2L
D128	DIODE	RU4A(A)
D129, 130	DIODE	RL4Z(A)
D131	ZENER DIODE	RD13ESB
D132, 133	DIODE	RL4Z(A)
D134	ZENER DIODE	HZS6A1L
D135	DIODE	1SS252
D136	ZENER DIODE	HZS6B1L
D137	ZENER DIODE	HZS18-1L
D138	ZENER DIODE	HZS6B1L
△ D140	DIODE	RB604(A)
<b>RELAYS</b>		
△ RY101	RELAY	ASR-512
△ RY102	RELAY	ASR1027
<b>COILS &amp; TRANSFORMERS</b>		
L102	COIL	ATH-133
△ L104	LINE FILTER	ATF1031
L105-116	FERRITE BEAD	ATX-028
△ T101	POWER TRANSFORMER	ATT1145
△ T102	CONVERTER TRANS	ATK1051
<b>CAPACITORS</b>		
C103	ELECTR.CAPACITOR	CEAS4R7M50
C104	ELECTR.CAPACITOR	CEAS102M25
C105, 106	ELECTR.CAPACITOR	CEAS101M16
△ C107, 108	CER CAP(0.01/AC250V)	ACG-001
C109	ELECTR.CAPACITOR	CEAS470M25
△ C110	CER CAP(0.01/AC250V)	ACG-001
C112	ELECTR.CAPACITOR	CEAS101M16
C113	ELECTR.CAPACITOR	CEAS100M50
C114	ELECTR.CAPACITOR	CEAS470M25
C115, 120	ELECTR.CAPACITOR	ACH1164
C121, 122	CKA (2200P/2KV)	ACG-039
C123	ELECTR.CAPACITOR	CEAS010M50
C124	ELECTR.CAPACITOR	ACH-378
C125	ELECTR.CAPACITOR	CEAS470M25
C126	ELECTR.CAPACITOR	CEAS101M16
C127	CERAMIC CAPACITOR	CCCSL151J50
C128	CERAMIC CAPACITOR	CCDSL221K500
C129	AUDIO FILM CAPACITOR	CFTXA474J50

Mark No.	Description	Parts No.
C130	ELECTR.CAPACITOR	ACH1132
C131	CERAMIC CAPACITOR	CCDSL221K500
C132	CER CAP	ACG1028
C133	MYLOR FILM CAPACITOR	CQMA222K50
C134	ELECTR.CAPACITOR	CEAS010M50
C135	CERAMIC CAPACITOR	CKCYF103Z50
C136, 137	CERAMIC CAPACITOR	CCDSL221K500
C138	CCA (100P/2KV)	ACG-032
C140	ELECTR.CAPACITOR	ACH1165
C142	ELECTR.CAPACITOR	ACH1146
C143	ELECTR.CAPACITOR	CEHAQ222M35
C144	CERAMIC CAPACITOR	CKDYF103Z500
C145	CERAMIC CAPACITOR	CCDSL221K500
C146	CERAMIC CAPACITOR	CKCYF473Z50
C147	CERAMIC CAPACITOR	CCDSL221K500
C148	CERAMIC CAPACITOR	CKCYF473Z50
C149	CERAMIC CAPACITOR	CKDYF103Z500
C150	ELECTR.CAPACITOR	CEAS331M35
C151, 152	ELECTR.CAPACITOR	CEHAQ222M35
C153	CERAMIC CAPACITOR	CKCYF473Z50
C154	ELECTR.CAPACITOR	CEAS100M25
C155	ELECTR.CAPACITOR	CEAS100M50
C156	ELECTR.CAPACITOR	CEAS010M50
C157	ELECTR.CAPACITOR	CEAS100M50
C158	CERAMIC CAPACITOR	CKCYB681K50
C159	ELECTROLYTIC CAPACIT	CEHAQ220M2C
C160, 161	ELECTR.CAPACITOR	CEAS010M50
C162	ELECTR.CAPACITOR	CEAS100M50
C163	ELECTR.CAPACITOR	CEAS221M16
C165	CERAMIC CAPACITOR	CKCYF102Z50
C166	ELECTR.CAPACITOR	CEAS470M25
C167	CKA (2200P/2KV)	ACG-039
<b>RESISTORS</b>		
VR158	VR	VRTS6VS102
R101	CARBONFILM RESISTOR	RD1/2PMFL3R9J
R111	RESISTOR (1.0, 5W)	ACN1032
R113	RESISTOR (1.0, 5W)	ACN1032
R117	CARBONFILM RESISTOR	RD1/2PMFL3R9J
R119	METAL OXIDE RESISTOR	RS1LMF473J
R120	CARBONFILM RESISTOR	RD1/2PMFL3R9J
R126	METAL OXIDE RESISTOR	RS3LMFR22J
R128	METAL OXIDE RESISTOR	RS3LMFR22J
R129	RESISTOR (1.5, 5W)	ACN1027
R131	CARBON FILM RESISTOR	RD1/4PMFL682J



Mark No.	Description	Parts No.
R133	METAL OXIDE RESISTOR	RS3LMF1R5J
R134	RESISTOR (1.5, 5W)	ACN1027
R137	METAL OXIDE RESISTOR	RS3LMF1R5J
R138	CARBONFILM RESISTOR	RD1/2PM241J
R141	CARBONFILM RESISTOR	RD1/2PM241J
R145	CARBON FILM RESISTOR	RD1/2PM390J
R146	METALFILM RESISTOR	RN1/4PC1603F
R152, 153	CEMENT RESISTOR	ACN1056
R155	METAL OXIDE RESISTOR	RS2LMF223J
R156	CARBON FILM RESISTOR	RD1/4PM154J
R157	METALFILM RESISTOR	RN1/4PC1603F
R159	METALFILM RESISTOR	RN1/4PC3601F
R160	METALFILM RESISTOR	RN1/4PC1603F
R161	CARBONFILM RESISTOR	RD1/2PMFL3R9J
R162	RESISTOR(330,5W)	RT7PD1R5K
R174	CARBONFILM RESISTOR	RD1/2PMFL8R2J
R180	METALFILM RESISTOR	RN1/4PC2101F
R181	METALFILM RESISTOR	RN1/4PC2431F
R184, 185	CARBONFILM RESISTOR	RD1/2PMFL3R9J
	Other resistors	RD1/8PM□□□J
<b>OTHERS</b>		
	SCREW (M3x12)	ABA-234
	MICA SHEET	AEP-056
	SCREW	BBZ30P080FCU
	SCREW	VBZ30P080FMC

**LINE FILTER Assembly (BWZ1225)****COIL**

△ L103	LINE FILTER	ATF1031
--------	-------------	---------

**CAPACITORS**

△ C101, 102	FLM CAP. (0.1/250V)	ACE-507
△ C116-119	FLM CAP. (6800P/250V)	ACE1009
C139	ELECTR.CAPACITOR	CEAS221M35

**RESISTORS**

R164	CARBONFILM RESISTOR	RD1/8PM3R9J
------	---------------------	-------------

Mark No.	Description	Parts No.
<b>R CRT DRIVE Assembly (BWZ1226)</b>		
<b>SEMICONDUCTORS</b>		
Q11, 12	TRANSISTOR	2SC3468
Q13	TRANSISTOR	2SA1371
Q14, 15	TRANSISTOR	2SC1740S
Q16	TRANSISTOR	2SA1371
△ Q17	TRANSISTOR	2SC2278
D11	DIODE	1SS252
D12-14	DIODE	1SS145
<b>COILS</b>		
L11	AXIAL INDUCTOR	LAU470K
L12	AXIAL INDUCTOR	LAU220K
L13	AXIAL INDUCTOR	LAU101K
<b>CAPACITORS</b>		
C11	CERAMIC CAPACITOR	CKDYB102K50
C12	ELECTR.CAPACITOR	CEAS101M25
C13	CERAMIC CAPACITOR	CKDYB681K50
C14, 15	ELECTROLYTIC CAPACIT	CEAS100M100
△ C16	CERAMIC CAPACITOR	ACG1001
C17	ELECTR.CAPACITOR (22/250)	BCH1003
C18	ELECTR.CAPACITOR	CEAS101M25
<b>RESISTORS</b>		
R12	METAL OXIDE RESISTOR	RS1LMF473J
R13	CARBON FILM RESOSTOR	RD1/4PMFL103J
R14	CARBON FILM RESISTOR	RD1/4PMFL102J
R15	METAL OXIDE RESISTOR	RS2LMF473J
R16	CARBON FILM RESOSTOR	RD1/4PMFL103J
△ R23	RESISTOR (47, 1/2W)	ACN-225
△ R24	RESISTOR (1.8K/1/2W)	ACN-221
R25, 26	METAL OXIDE RESISTOR	RS3LMF332J
	Other resistors	RD1/8PM□□□J
<b>OTHERS</b>		
	CRT SOCKET	AKG1004
	SCREW	PBZ30P060FMC

**G CRT DRIVE Assembly (BWZ1227)****SEMICONDUCTORS**

Q41, 42	TRANSISTOR	2SC3468
Q43	TRANSISTOR	2SA1371
Q44, 45	TRANSISTOR	2SC1740S
Q46	TRANSISTOR	2SA1371
△ Q47	TRANSISTOR	2SC2278
D41	DIODE	1SS252
D42-44	DIODE	1SS145

Mark No.	Description	Parts No.
<b>COILS</b>		
L41	AXIAL INDUCTOR	LAU470K
L42	AXIAL INDUCTOR	LAU220K
L43	AXIAL INDUCTOR	LAU101K

**CAPACITORS**

C41	CERAMIC CAPACITOR	CKDYB102K50
C42	ELECTR.CAPACITOR	CEAS101M25
C43	CERAMIC CAPACITOR	CKDYB681K50
C44, 45	ELECTROLYTIC CAPACIT	CEAS100M100
△ C46	CERAMIC CAPACITOR	ACG1001
C47	ELECTR.CAPACITOR (22/250)	BCH1003
C48	ELECTR.CAPACITOR	CEAS101M25

**RESISTORS**

R42	METAL OXIDE RESISTOR	RS1LMF473J
R43	CARBON FILM RESOSTOR	RD1/4PMFL103J
R44	CARBON FILM RESISTOR	RD1/4PMFL102J
R45	METAL OXIDE RESISTOR	RS2LMF473J
R46	CARBON FILM RESOSTOR	RD1/4PMFL103J

△ R53	RESISTOR (47, 1/2W)	ACN-225
△ R54	RESISTOR (1.8K, 1/2W)	ACN-221
R55, 56	METAL OXIDE RESISTOR	RS3LMF332J
	Other resisiters	RD1/8PM□□□J

**OTHERS**

CRT SOCKET	AKG1004
SCREW	PBZ30P060FMC

**B CRT DRIVE Assembly (BWZ1228)**
**SEMICONDUCTORS**

Q71, 72	TRANSISTOR	2SC3468
Q73	TRANSISTOR	2SA1371
Q74, 75	TRANSISTOR	2SC1740S
Q76	TRANSISTOR	2SA1371
△ Q77	TRANSISTOR	2SC2278

D71	DIODE	1SS252
D72-74	DIODE	1SS145

**COILS**

L71	AXIAL INDUCTOR	LAU470K
L72	AXIAL INDUCTOR	LAU220K
L73	AXIAL INDUCTOR	LAU101K

Mark No.	Description	Parts No.
<b>CAPACITORS</b>		
C71	CERAMIC CAPACITOR	CKDYB102K50
C72	ELECTR.CAPACITOR	CEAS101M25
C73	CERAMIC CAPACITOR	CKDYB681K50
C74, 75	ELECTROLYTIC CAPACIT	CEAS100M100
△ C76	CERAMIC CAPACITOR	ACG1001
C77	ELECTR.CAPACITOR (22/250)	BCH1003
C78	ELECTR.CAPACITOR	CEAS101M25

**RESISTORS**

R72	METAL OXIDE RESISTOR	RS1LMF473J
R73	CARBON FILM RESOSTOR	RD1/4PMFL103J
R74	CARBON FILM RESISTOR	RD1/4PMFL102J
R75	METAL OXIDE RESISTOR	RS2LMF473J
R76	CARBON FILM RESOSTOR	RD1/4PMFL103J

△ R83	RESISTOR (47, 1/2W)	ACN-225
△ R84	RESISTOR (1.8K, 1/2W)	ACN-221
R85, 86	METAL OXIDE RESISTOR	RS3LMF332J
	Other resistors	RD1/8PM□□□J

**OTHERS**

CRT SOCKET	AKG1004
SCREW	PBZ30P060FMC

**MICROCOMPUTER Assembly (BWZ1229)**
**SEMICONDUCTORS**

IC231	LOGIC IC	TC4066BP
IC232	LOGIC IC	TC4001BP
IC233	IC	UPD4711ACX
IC234	LOGIC IC	TC4021BP
IC235	LOGIC IC	TC74HC153AP

IC236	TV SYSTEM CONT' L	PDF004A9
IC237	REGULATOR IC	UPC78L05
IC238, 239	IC	MB88346P-G
IC240	E-EPROM IC	M6M80011AP
IC241	OSD IC	UPD6145C-001

IC246, 248	OP-AMP IC	M5220L
IC250	OP-AMP IC	M5220L

Q231	TRANSISTOR	DTC124ES
Q232	TRANSISTOR	2SC1740S
Q233	TRANSISTOR	2SA933S
Q235, 236	TRANSISTOR	2SA933S
Q237	TRANSISTOR	2SC1740S

Mark No.	Description	Parts No.
Q238	TRANSISTOR	DTC124ES
Q239	TRANSISTOR	2SA933S
Q240	TRANSISTOR	2SC1740S
Q241	TRANSISTOR	2SA933S
Q242	TRANSISTOR	2SC1740S
Q243	TRANSISTOR	DTC124ES
Q244-250	TRANSISTOR	2SC1740S
Q251	TRANSISTOR	DTC124ES
Q252	TRANSISTOR	2SA933S
Q253	TRANSISTOR	2SC1740S
Q254-262	TRANSISTOR	2SA933S
Q263	TRANSISTOR	2SC1740S
D231	ZENER DIODE	RD5.1ESB
D232	DIODE	1SS252
D233	LED (GREEN)	AEL1136
D234	DIODE	1SS252
D235	ZENER DIODE	RD3.0ESB
D236	ZENER DIODE	HZS5BL
D237-240	DIODE	1SS252
<b>SWITCHES</b>		
S231	TACT SWITCH	ASG1022
S232	DITPU SWITCH	ASD1015
S233-235	SLIDE SWITCH	ASH1009
S236	SWITCH	ASH1003
S237	PUSH SWITCH	SUNL2S
S238	SWITCH	ASH1007
<b>COILS</b>		
L231	AXIAL INDUCTOR	LAU100K
L232	AXIAL INDUCTOR	LAU470K
<b>CAPACITORS</b>		
C231	ELECTR.CAPACITOR	CEAS470M10
C232	CERAMIC CAPACITOR	CKCYF103Z50
C233-237	ELECTR.CAPACITOR	CEAS100M50
C238	ELECTR.CAPACITOR	CEAS470M10
C239	ELECTR.CAPACITOR	CEASR68M50
C240	ELECTR.CAPACITOR	CEASR47M50
C241	CERAMIC CAPACITOR	CKCYF103Z50
C242, 243	CERAMIC CAPACITOR	CCCCH220J50
C244	ELECTR.CAPACITOR	CEAS100M50
C245	CERAMIC CAPACITOR	CKCYF103Z50
C246	ELECTR.CAPACITOR	CEAS100M50
C247, 248	ELECTR.CAPACITOR	CEAS470M10
C249-251	CERAMIC CAPACITOR	CKCYF103Z50
C252	ELECTR.CAPACITOR	CEAS2R2M50
C253	MYLOR FILM CAPACITOR	CQMA272J50
C254	CERAMIC CAPACITOR	CKCYB472K50
C255	ELECTR.CAPACITOR	CEAS470M10
C256	CERAMIC CAPACITOR	CKCYB392K50
C257	CERAMIC CAPACITOR	CKCYF103Z50
C258, 260	ELECTR.CAPACITOR	CEAS470M10

Mark No.	Description	Parts No.
C261	CERAMIC CAPACITOR	CCCUJ330J50
C262	ELECTR.CAPACITOR	CEAS470M16
C263, 265	CERAMIC CAPACITOR	CKCYF102Z50
C266-268	CERAMIC CAPACITOR	CCCSL470J50
C269, 270	ELECTR.CAPACITOR	CEAS470M25
C271-279	CERAMIC CAPACITOR	CCCSL470J50
C280, 281	ELECTR.CAPACITOR	CEAS010M50
C282, 283	CERAMIC CAPACITOR	CKCYF103Z50
C284-287	ELECTR.CAPACITOR	CEAS010M50
C289-296	CERAMIC CAPACITOR	CKCYF102Z50
C297, 298	CERAMIC CAPACITOR	CKCYF103Z50
C299	ELECTR.CAPACITOR	CEAS470M16
TC231	CERAMIC TRIMMER	ACM-017
<b>RESISTORS</b>		
R1824	CARBONFILM RESISTOR	RD1/2PM681J
R1921, 1922	CARBON FILM RESISTOR	RD1/2PM470J
R1942	CARBON FILM RESISTOR	RD1/2PM4R7J
R1943	CARBON FILM RESISTOR	RD1/2PM100J
R1944, 1945	CARBON FILM RESISTOR	RD1/2PM4R7J
R1946	CARBON FILM RESISTOR	RD1/2PM100J
	Other resistors	RD1/8PM□□□J
<b>OTHERS</b>		
CN231	SOCKET SOCKET(25P)	BKP1005 AKP1080
X231	CRYSTAL OSCILLATOR	ASS-013

**CONTROL Assembly (BWV1002)**
**SEMICONDUCTORS**

IC501, 502	TV IC	PA0036
IC503	LOGIC IC	TC74HC04AP
IC504, 505	LOGIC IC	TC4021BP
IC506-512	OP-AMP IC	M5220L
Q501	TRANSISTOR	2SA933S
Q502, 503	TRANSISTOR	2SC1740S
Q504-510	TRANSISTOR	2SA933S
Q511, 512	TRANSISTOR	2SC1740S
D501	ZENER DIODE	RD8.2ESB
D502, 503	DIODE	1SS252
D504, 505	ZENER DIODE	RD6.2ESB
D506	DIODE	1SS252
D507	ZENER DIODE	HZS12BL

Mark No.	Description	Parts No.
D508, 509	ZENER DIODE	UZ-24BSC
D510	DIODE	1SS252
D511	ZENER DIODE	RD5.6ESB
D512-537	ZENER DIODE	UZ-24BSC
D539, 540	DIODE	OA90A-M
D542, 543	DIODE	1SS252
<b>SWITCHES</b>		
S501	SWITCH	ASG1040
S502	SLIDE SWITCH	ASH1010
S503	SLIDE SWITCH	ASH1037
S504	SLIDE SWITCH	ASH1010
S505	SLIDE SWITCH	ASH1027
S506	SWITCH	ASG-705
S507	SLIDE SWITCH	ASH1010
S508-512	SWITCH	ASG1040
S513-515	SLIDE SWITCH	ASH1010
<b>CAPACITORS</b>		
C501	CERAMIC CAPACITOR	CKDYF103Z50
C502	ELECTR.CAPACITOR	CEAS010M50
C503	CERAMIC CAPACITOR	CKCYF103Z50
C504	MYLOR FILM CAPACITOR	CQMA821K50
C505	AUDIO FILM CAPACITOR	CFTXA104J50
C506	MYLOR FILM CAPACITOR	CQMA473K50
C507	MYLOR FILM CAPACITOR	CQMA224K50
C508	ELECTR.CAPACITOR	CEAS100M50
C509	CERAMIC CAPACITOR	CKDYF103Z50
C510	ELECTR.CAPACITOR	CEAS100M50
C511	ELECTR.CAPACITOR	CEANP100M16
C512	ELECTR.CAPACITOR	CEAS2R2M50
C513	ELECTR.CAPACITOR	CEAS100M50
C514	MYLOR FILM CAPACITOR	CQMA471K50
C515	MYLOR FILM CAPACITOR	CQMA332K50
C516	MYLOR FILM CAPACITOR	CQMA224K50
C517	PL.STYRENE CAPACITOR	CQSA152J50
C518-521	CERAMIC CAPACITOR	CKCYX473M25
C522	MYLOR FILM CAPACITOR	CQMA471J50
C523	ELECTR.CAPACITOR	CEAS470M10
C524	PL.STYRENE CAPACITOR	CQSA102G50
C525-528	ELECTROLYTIC CAPACIT	CEAS102M6
C529	MYLOR FILM CAPACITOR	CQMA103K50
C530, 531	CERAMIC CAPACITOR	CKCYX473M25
C532	CERAMIC CAPACITOR	CCMCH100D50

Mark No.	Description	Parts No.
C533	ELECTR.CAPACITOR	CEAS010M50
C534	CERAMIC CAPACITOR	CKCYX473M25
C535	CERAMIC CAPACITOR	CKCYF103Z50
C536	ELECTR.CAPACITOR	CEAS100M50
C537	CERAMIC CAPACITOR	CKCYX473M25
C538	CERAMIC CAPACITOR	CCMCH100D50
C539	CERAMIC CAPACITOR	CKCYF103Z50
C541	CERAMIC CAPACITOR	CKCYX473M25
C542	ELECTR.CAPACITOR	CEAS220M50
C543	MYLOR FILM CAPACITOR	CQMA223K50
C544	CERAMIC CAPACITOR	CKCYX473M25
C545	ELECTR.CAPACITOR	CEAS220M50
C546	ELECTR.CAPACITOR	CEAS101M16
C547, 548	CERAMIC CAPACITOR	CKCYX473M25
C549	ELECTR.CAPACITOR	CEAS101M16
C551-554	CERAMIC CAPACITOR	CKCYX473M25
C555	ELECTR.CAPACITOR	CEAS220M16
C556, 557	CERAMIC CAPACITOR	CKCYX473M25
C559	ELECTR.CAPACITOR	CEJA221M6
C560, 561	CERAMIC CAPACITOR	CKCYX473M25
C562, 563	ELECTR.CAPACITOR	CEJA221M6
C564	CERAMIC CAPACITOR	CKCYX473M25
C565, 566	ELECTR.CAPACITOR	CEJA221M6
C567, 568	CERAMIC CAPACITOR	CKCYX473M25
C569, 570	ELECTR.CAPACITOR	CEJA221M6
C571-573	CERAMIC CAPACITOR	CKCYX473M25
C574-577	ELECTR.CAPACITOR	CEJA221M6
C578	CERAMIC CAPACITOR	CKCYX473M25
C579	ELECTR.CAPACITOR	CEJA221M6

**RESISTORS**

VR501-569	VR	ACP1042
VR571	VR	ACP1044
VR572	VR	ACP1040
VR573, 574	VR	ACP1043
VR575	VR	ACP1045

R506	RESISTOR ARRAY (10k)	RA8S103J
R539	RESISTOR ARRAY (10k)	RA8S103J

Other resistors RD1/8PM□□□□



## 8. ADJUSTMENTS

Adjustments should be performed according to the sequence described in this chapter. After repair, the adjustment method differs depending on the repaired assembly. See Section "8.1 ADJUSTMENT REQUIRED AFTER REPAIR OR REPLACEMENT OF EACH ASSEMBLY" to confirm the items to be adjusted.

### 8.1 ADJUSTMENT REQUIRED AFTER REPAIR OR REPLACEMENT OF EACH ASSEMBLY

Adjustment No. in ( ) corresponds to that in Section "8.2 ADJUSTING EACH PART".

#### 8.1.1 Deflection assembly

##### • After repaired

- 1) (Adjustment 10) X-ray protective circuit adjustment
- 2) (Adjustment 11) High voltage (anode voltage) adjustment
- 3) (Adjustment 15) Focus variable resistor (VR1) adjustment
- 4) (Adjustment 16) Vertical size adjustment
- 5) (Adjustment 17) Horizontal size adjustment

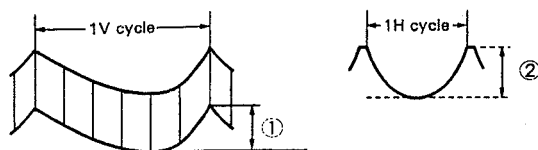
##### • After replaced

- 1) (Adjustment 15) Focus variable resistor (VR1) adjustment
- 2) (Adjustment 17) Horizontal size adjustment
- 3) (Adjustment 21) White balance adjustment

##### Note :

It is required to check the following voltage waveforms according to the adjustments below after repair or replacement:

- 1) Connect the oscilloscope to pin 1 of connector U7 using the 100:1 probe.
- 2) Confirm that the voltage waveform is parabolic as shown in Fig. 8-1.
- 3) If the voltage waveform is abnormal, adjust the H and V parabolic waveforms according to Adjustment 18 and the horizontal size according to Adjustment 17.
- 4) After confirming the voltage waveform, adjust the focus variable resistor (VR1) according to Adjustment 15.



① : 270V

② : 960Vp-p

Fig. 8-1 Voltage waveform at connector U7 pin1

#### 8.1.2 Video assembly

##### • After repaired

- 1) (Adjustment 2) Comb filter adjustment
- 2) (Adjustment 3) Horizontal AFC adjustment
- 3) (Adjustment 4) Oscillator frequency adjustment
- 4) (Adjustment 5) Adjustment of synchronizing signal level (1)
- 5) (Adjustment 6) Adjustment of synchronizing signal level (2)
- 6) (Adjustment 7) Peripheral light compensating APL setting level adjustment
- 7) (Adjustment 8) V.BLK pulse width adjustment
- 8) (Adjustment 9) Screen VR adjustment
- 9) (Adjustment 20) Blue tailing adjustment
- 10) (Adjustment 21) PIONEER standard setting adjustment

##### • After replaced

- 1) (Adjustment 9) Screen VR adjustment
- 2) (Adjustment 20) Blue tailing adjustment
- 3) (Adjustment 21) PIONEER standard setting adjustment

#### 8.1.3 Microcomputer assembly

##### • After repaired or replaced

- 1) (Adjustment 19) Character position adjustment
- 2) (Adjustment 21) PIONEER standard setting adjustment

#### 8.1.4 Convergence amplifier and Power supply assembly

##### • After repaired

- 1) Check the convergence, and adjust the convergence according to Adjustment 18 if it deviates.

##### • After the convergence amplifier is repaired

- 1) (Adjustment 18) Convergence adjustment

##### • After the Power supply assembly is repaired

- 1) (Adjustment 1) 135V power supply adjustment

#### 8.1.5 Control assembly

##### • After repaired or replaced

- 1) (Adjustment 18) Convergence adjustment

#### 8.1.6 CRT drive assembly (R, G, B)

##### • After repaired or replaced

- 1) Check the white balance, and adjust the white balance according to Adjustment 21 if it deviates.

### 8.1.7 CRT assembly (R, G, B)

- To replace the assembly, see Chapter "9. REPLACING THE CRT ASSEMBLY".
- After one or two CRT drive assemblies are replaced, adjust the items below using the remaining CRT drive assemblies as the standard. If the remaining CRT drive assemblies include the green CRT drive assembly, use it as the standard.

- 1) (Adjustment 12) Deflection yoke inclination adjustment
- 2) (Adjustment 13) Screen center adjustment
- 3) (Adjustment 15) Focus variable resistor (VR1) adjustment
- 4) (Adjustment 18) Convergence adjustment
- 5) (Adjustment 21) PIONEER standard setting adjustment

### 8.1.8 Lens assembly

- After replaced

- 1) (Adjustment 15) Focus variable resistor (VR1) adjustment

## 8.2 ADJUSTING EACH PART

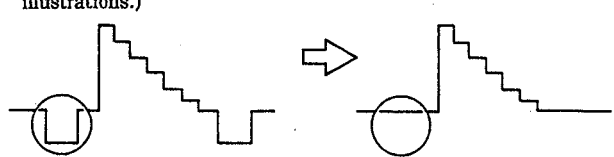
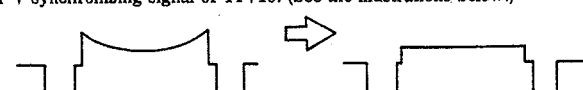
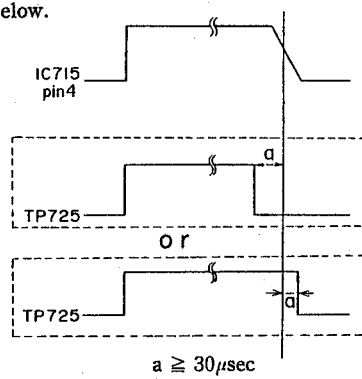
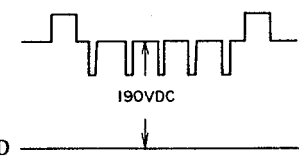
- For sections to be adjusted in each part and the TP terminal positions, see Fig. 8-8.
- G, R, and B shown in the columns "Sections to be adjusted" and "Adjusting method" are the abbreviations of green, red and blue respectively.
- A symbol in [ ] in the column "Sections to be adjusted" is the abbreviation of an assembly including the section to be adjusted.

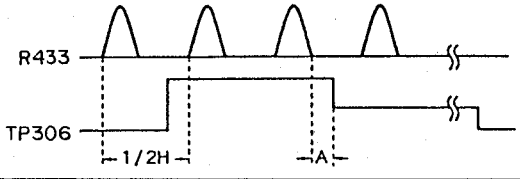
The abbreviations are explained below.

- C : Control assembly  
D : Deflection assembly  
M : Microcomputer assembly  
P : Convergence amplifier and Power supply assembly  
V : Video assembly  
VR1 : Focus variable resistor

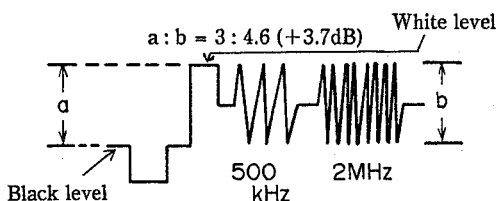
- The input signal is input to the "VIDEO" terminal on the rear panel unless otherwise specified.
- Set the picture quality during adjustment to "Standard (push STD key on the control box.)" unless otherwise specified.

No.	Adjustment items	Input signal	Sections to be adjusted	Adjusting method																
1	135V power supply adjustment	No signal	VR158 [P]	Set the D128 cathode voltage to 135V ±0.5V.																
	Note: After adjusting the 135 V power supply, confirm the following voltage values :																			
	<table><tr><th>Sections to be measured</th><th>Voltage values</th><th>Sections to be measured</th><th>Voltage values</th></tr><tr><td>Between +23V (D133 cathode) and GND (PCB frame)</td><td>23V±3V</td><td>Between -23V (D132 anode) and GND (PCB frame)</td><td>-23V±3V</td></tr><tr><td>Between +13.5V (K6 pin2) and GND (PCB frame)</td><td>13.5V±0.5V</td><td>Between +37V (K5 pin2) and GND (PCB frame)</td><td>37V±2V</td></tr><tr><td colspan="2"></td><td>Between heater voltage : H.T. +(K6 pin5) and H.T. -(K6 pin4)</td><td>6.45V±0.25V</td></tr></table>				Sections to be measured	Voltage values	Sections to be measured	Voltage values	Between +23V (D133 cathode) and GND (PCB frame)	23V±3V	Between -23V (D132 anode) and GND (PCB frame)	-23V±3V	Between +13.5V (K6 pin2) and GND (PCB frame)	13.5V±0.5V	Between +37V (K5 pin2) and GND (PCB frame)	37V±2V			Between heater voltage : H.T. +(K6 pin5) and H.T. -(K6 pin4)	6.45V±0.25V
	Sections to be measured	Voltage values	Sections to be measured	Voltage values																
	Between +23V (D133 cathode) and GND (PCB frame)	23V±3V	Between -23V (D132 anode) and GND (PCB frame)	-23V±3V																
Between +13.5V (K6 pin2) and GND (PCB frame)	13.5V±0.5V	Between +37V (K5 pin2) and GND (PCB frame)	37V±2V																	
		Between heater voltage : H.T. +(K6 pin5) and H.T. -(K6 pin4)	6.45V±0.25V																	
2	Comb filter adjustment	Color bar	VR701, L704 [V]	Minimize the 3.58MHz component of TP702.																
3	Horizontal AFC adjustment	No signal	VR304 [D]	Set the TP316 (H.BLK) frequency to 15734 ±50Hz.																
4	X'tal Oscillator frequency adjustment	No signal	TC701 [V]	<p>Note: Perform this adjustment only if IC706 or the parts related to the oscillator (BSS1013) are replaced.</p> <ul style="list-style-type: none"><li>Set the TP707 oscillation frequency to 14.318180 MHz ±40Hz.</li></ul>																

No.	Adjustment items	Input signal	Sections to be adjusted	Adjusting method
5	Adjustment of synchronizing signal level (1)	10 steps or other black (OIRE) component signal	VR732 [V]	<ul style="list-style-type: none"> <li>Set the TP709 horizontal synchronizing signal level to the same as the pedestal level (OIRE) of the video signal (G). (See the following illustrations.)</li> </ul> 
6	Adjustment of synchronizing signal level (2)	10 steps or other black (OIRE) component signal	VR720 (G) [V], VR718 (R) [V], VR719 (B) [V]	<p><i>Note:</i> Perform this adjustment after setting all the adjusted values of CONTRAST, BRIGHT, R-HIGH, R-LOW, B-HIGH, and B-LOW to 128.</p> <p>G : Set the TP723 horizontal synchronizing signal level to the same as the pedestal level (OIRE) of the video signal.</p> <p>R : Set the TP722 signal level in the same way as G.</p> <p>B : Set the TP724 signal level in the same way as G.</p>
7	Peripheral light compensating APL setting level adjustment	APL 10% video signal or 7.5 IRE black burst	VR731 [V]	<p>Adjust VR731 to eliminate the peripheral light compensating waveform of the H or V synchronizing signal of TP718. (See the illustrations below.)</p> 
8	V.BLK pulse width adjustment	Color bar, or other (not specified)	VR730 [V]	<p>Set the V.BLK pulse width of TP725 to <math>710\mu\text{sec} \pm 20\mu\text{sec}</math>. Then, compare the V.BLK pulse of TP725 with the pulse of IC715 pin4, and adjust VR730 to set the rising position as shown in the diagrams below.</p> 
9	Screen VR adjustment	Crosshatch	VR1	<ul style="list-style-type: none"> <li>Set R and B to OFF by RGB ON/OFF SW to light G only. Control brightness VR so that the dark portion begins to lighten.</li> <li>Set the cut-off level of TP-GK (TP45) to 190V (DC) using G screen VR of the G CRT drive assembly.</li> </ul>  <ul style="list-style-type: none"> <li>Light R and B, and adjust R and B screen VRs in the same adjustment as G, respectively.</li> </ul>
10	X-ray protective circuit adjustment	White 100%	VR306 [D]	<p><i>Note:</i> Perform this adjustment only after the x-marked part is replaced. For the adjusting method, see Section "8.3 ADJUSTING THE HIGH VOLTAGE CIRCUIT".</p>
11	High voltage (anode voltage) adjustment	Black burst	VR305 [D]	

No.	Adjustment items	Input signal	Sections to be adjusted	Adjusting method
12	Deflection yoke inclination adjustment	Cross pattern signal (or display the test cross pattern for the convergence adjustment while any signal is input.)	Position for installing the deflection yoke of the replaced color (left and right inclinations)	<p><i>Note:</i> Perform this adjustment after the CRT assembly or deflection yoke is replaced.</p> <ul style="list-style-type: none"> <li>Loosen the screws fixing the deflection yoke of the replaced color and match the inclinations of the vertical and horizontal lines at the center of the screen to those of one of the existing colors by rotating the yoke to the left and right.</li> <li>After adjustment, tighten the screws to fix the deflection yoke.</li> </ul>
13	Screen center adjustment	Cross pattern signal (or display the test cross pattern for the convergence adjustment while any signal is input.)	Centering magnet of the deflection yoke of the replaced color (See Fig. 8-8.)	<p><i>Note:</i> Perform this adjustment to match the screen center point after the CRT assembly or deflection yoke is replaced. Before adjustment, set each adjusted value of the static convergence in the control box.</p> <ul style="list-style-type: none"> <li>Move the centering magnet of the deflection yoke of the replaced color to match the vertical and horizontal lines at the center of the screen to those of one of the existing colors.</li> </ul>
14	Vertical pulse width adjustment	Black burst	VR303 [D]	<p>Observe the waveforms of TP306 and R433 (on the rear panel side) simultaneously to set A in the following diagram to <math>10 \pm 2 \mu\text{sec}</math>.</p> 
15	Focus adjustment	Crosshatch	Focus of the lens assembly installed in the CRT assembly of the replaced color and of the focus variable resistor	<ul style="list-style-type: none"> <li>Move the lens assembly to the left and right to optimize the focus.</li> <li>Rotate the focus VR to optimize the focus.</li> <li>Repeat adjusting the lens assembly and focus VR.</li> </ul> <p><i>Note:</i> Perform the following adjustment only after the blue focus is adjusted. Rotate blue focus VR clockwise to slightly thicken the blue to a degree where the blue does not exceed the crosshatch on the screen. As a guide, the focus VR is rotated by about 10 to 15 degrees.</p>
16	Vertical size adjustment	Monoscope	VR301 [D]	<ul style="list-style-type: none"> <li>Light the green only using the ON/OFF SWs for R, G, and B, and set the green V size VR of the control box to the center.</li> <li>Adjust the vertical size to <math>92\% \pm 3\%</math>.</li> </ul>
17	Horizontal size adjustment	Monoscope	VR307 [D]	<ul style="list-style-type: none"> <li>Light the green only using the ON/OFF SWs for R, G, and B, and set the green H size VR of the control box to the center.</li> <li>Adjust the horizontal size to <math>93\% \pm 2\%</math>.</li> </ul>
18	Convergence adjustment	Crosshatch	VRs in the control assembly	<ul style="list-style-type: none"> <li>Adjust the parabolic waveform.</li> <li>Compensate with VR so that the green crosshatch screen is normally displayed while only the green CRT drive assembly is operated.</li> <li>Compensate the red line so that it matches the green line on the crosshatch screen while the green and red CRT drive assemblies are operated.</li> <li>Compensate the blue line so that it matches the green line on the crosshatch screen while the green and blue CRT drive assemblies are operated.</li> </ul> <p><i>Note:</i> For the detailed adjustment of the convergence, see Section "8.4 ADJUSTING THE CONVERGENCE".</p>



No.	Adjustment items		Input signal	Sections to be adjusted	Adjusting method
19	Character position adjustment		Any video signal	TC231 [M]	<ul style="list-style-type: none"> <li>Set TEST SW (S507[C]) to ON to display the character screen. Adjust so that the test cross pattern is located at the center of the screen.</li> </ul>
20	Blue tailing adjustment		Cross pattern signal	VR729 [V]	<ul style="list-style-type: none"> <li>Maximize the output of input cross pattern signal SG.</li> <li>Maximize the contrast using the control box. (See page 92.)</li> <li>Rotate VR729 clockwise to the end.</li> <li>Adjust the vertical line of the cross pattern on the screen to eliminate the blue tailing. If the blue does not tail when VR729 is fully rotated, leave VR as it is.</li> </ul>
21	PIONEER standard setting adjustment	Sharpness adjustment	Multi-burst (TG-7)	VR704 [V]	<p><b>Note :</b> Set the sharpness value to 158 before adjustment. Set the TP704 waveform to the ratio shown in the following diagram.</p> 
		Contrast, brightness, and white balance adjustments	10 steps or color bar (color SW : OFF)	Contrast Brightness R-HIGH R-LOW B-HIGH B-LOW [C]	<p><b>Note :</b> Perform these adjustments after adjusting synchronizing signal levels (1) and (2).            Alternately adjust the contrast and brightness to find the best positions.            Contrast ..... Adjust the bright portion.            Brightness ..... Adjust the dark portion.            Adjust the white balance of the bright portion using R-HIGH and B-HIGH, and adjust the white balance of the dark portion using R-LOW and B-LOW. Repeat these adjustments several times to find the best positions.            After completion of the adjustments, simultaneously press the FAST and STD keys of the control box to memorize the standard set values.</p>
		Color bar and a signal with a skin color portion		Color tint [C]	<ul style="list-style-type: none"> <li>Optimize the screen by referencing the color bar and the human face color.</li> <li>After completion of the adjustment, simultaneously press the FAST and STD keys of the control box to memorize the standard set values.</li> </ul>

## 8.3 ADJUSTING THE HIGH VOLTAGE CIRCUIT

- Observe safety precautions while working with high voltage.
- Be sure to work according to the procedures to prevent exposure to X-ray radiation.
- Prepare the VR jig before adjusting the X-ray protective circuit.

(a) Parts related to the high voltage circuit  
(parts with an "x" mark in the service manual)

Deflection assembly (BWJ1003)	Adjustment required after replaced
T301, Q335, Q336, D326, D322, VR306, R434, R435, R442-R445, R447, R448, R107-R111, R163	X-ray protective circuit (*1)
T301, D316, VR305, R403, R410, R411, R414, R416, R417, R420, R426	High voltage circuit (*1)

Note :

\*1 : Always adjust the X-ray protective circuit first after the flyback transformer (T301) is replaced.

(b) Preparation before adjustment

- Before replacing the parts related to the high voltage circuit, remove the shielded cover (ANH1166) enveloping the semi-fixed resistor (VR305 or VR306).

Note:

The semi-fixed resistor is covered with a glass tube.

Adjustment should be performed without removing the glass tube. Otherwise, the adjusted value can change when the glass tube is replaced.

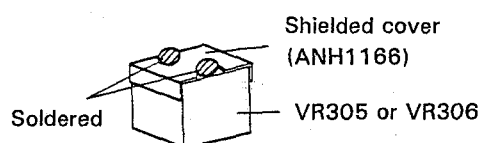


Fig. 8-2 Shielded cover of the semi-fixed resistor

### 8.3.1 Anode cable connection and disconnection

#### SERVICEMAN WARNING

Before removing the anode cable, turn off the power, unplug the AC plug and let the unit discharge for more than 1 minute.

Disconnect the FBT anode cable as outlined in Fig. 8-3. Confirm the extension of the rubber cover before disconnecting the cable, then it is easy connect the anode cable after the anode voltage is measured.

When connecting the anode cable, proceed in the reverse order as mentioned above. Confirm that the cable will not come off by pulling it after the cable is connected.

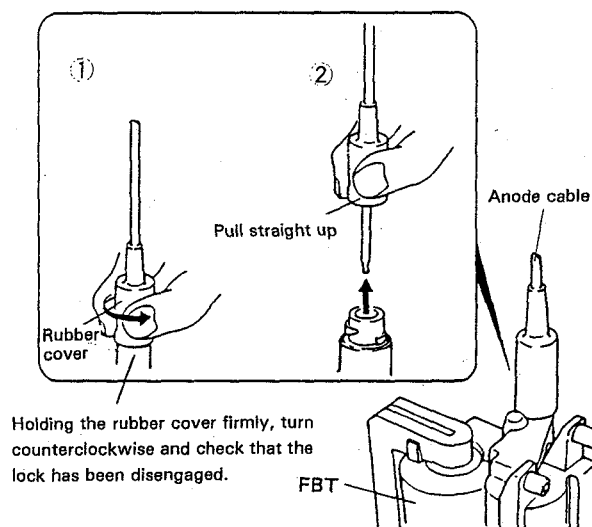


Fig. 8-3 Disconnecting the anode cable

- Connecting the high voltage meter (GGF-185) and high voltage distributor (GGF1011)

As shown in Fig. 8-4, connect the anode cable to the connector of the high voltage distributor, the same cable as the anode cable of the high voltage distributor to the FBT, and the high voltage probe of the high voltage meter (GGF-185) to the high voltage distributor.

**Note :**

Accurately connect the cables. Incomplete connection causes the FBT to be overloaded, so that excessively high voltage is generated at the FBT output. It is extremely dangerous.

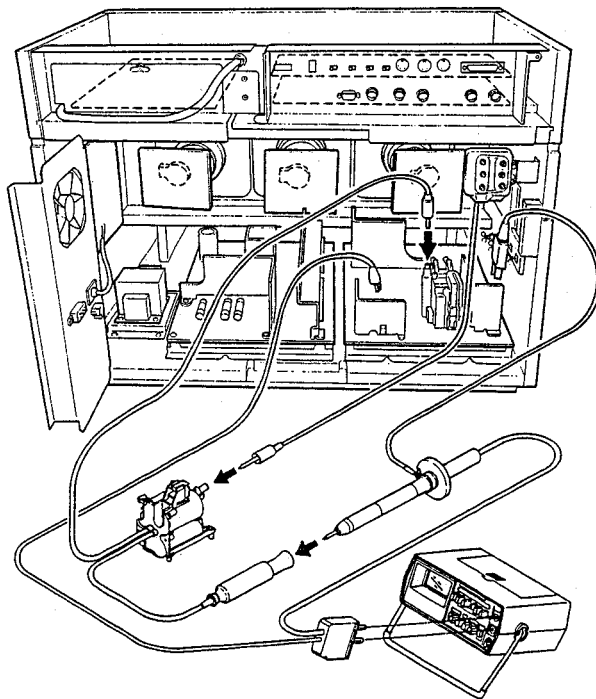


Fig. 8-4 Connections of the high voltage meter and distributor

### 8.3.2 Adjusting the X-ray protective circuit

1. Rotate VR of the VR jig clockwise to the end, and connect the VR jig to TP103, TP104, and TP105 of the power assembly.

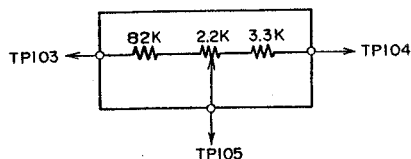


Fig. 8-5 VR jig

2. Short TP317 and TP318 of the deflection assembly.
3. Rotate VR306 of the deflection assembly clockwise to the end.
4. Connect the power plug to the outlet and turn POWER SW ON.
5. Input the white 100% (full-field) signal.
6. Rotate VR of the jig to set the anode voltage (of the high voltage meter) to 34.6kV.
7. Slowly rotate VR306 counterclockwise to the end, and stop where the X-ray protective circuit starts operating (the power is turned OFF).
8. Disconnect the power plug from the outlet, and wait for 15 seconds.
9. Rotate the VR jig clockwise to the end.
10. Connect the power plug to the outlet, and turn the power ON.
11. Slowly rotate the VR jig counterclockwise to set the high voltage meter value to 34.4kV. Retain this value for about 10seconds to confirm that the X-ray protective circuit does not operate. If it operates, restart the adjustment from Step 3.
12. Slowly rotate the VR jig further counterclockwise to confirm that the X-ray protective circuit operates before the high voltage meter value reaches 34.8kV. If it does not operate beyond 34.8kV, restart the adjustment from Step 2.
13. Disconnect the power plug from the outlet, and remove the VR jig from the power assembly.

### 8.3.3 Adjusting the high voltage (anode voltage)

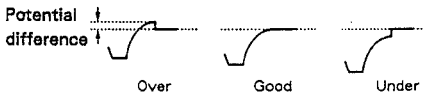
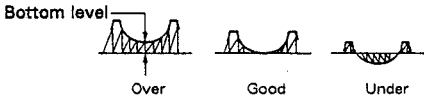
1. Rotate VR305 (H.V.ADJ) of the deflection assembly counterclockwise to the end.
2. Input the black burst signal to the input terminal.
3. Connect the power plug to the outlet, and turn the power on.
4. Confirm that the input selector corresponds to the input terminal to which the black burst signal is input.
5. Slowly rotate VR305 clockwise to the end to adjust the high voltage meter value to 31.0kV  $\pm$  0.1kV.
6. Turn the power off, and disconnect the power plug from the outlet.

### 8.3.4 Postprocessing

- Be sure to reinstall and solder the shielded cover (ANH1166) of the semi-fixed resistor (VR305 or VR306) removed before adjustment.
- Remove the high voltage distributor, and confirm that the anode cable is correctly connected to the FBT if installed. (See Section "8.3.1 Anode cable connection and disconnection")
- Always replace the wire to the previous position before installing the power or deflection assembly.

## 8.4 ADJUSTING THE CONVERGENCE

### 8.4.1 Adjusting the parabolic waveform

No.	Adjustment items	Section to be adjusted	Adjusting method
1	H parabolic waveform adjustment	VR574	Adjust VR574 so that the potential difference of the TP504 (H-PARA ADJ.) output waveform will be $0V \pm 20mV$ . 
2	V parabolic waveform adjustment	VR575	Adjust VR575 so that the bottom level of the TP503 (V-PARA ADJ.) output waveform will be $0V \pm 20mV$ . 

### 8.4.2 Adjusting the convergence

- See Fig. 8-6 for adjusting the horizontal compensation and see Fig. 8-7 for adjusting the vertical compensation.

#### (1) Adjusting the green line

- Accurately adjust the green line, which is used as the standard line for adjusting the red and blue lines.
- Turn off the RED and BLUE switches of the control box to display the green signal only on the screen.
- Match the green line to the crosshatch used as the standard for each VR.
- After adjusting each item is completed, reconfirm the green line by viewing the entire screen. Fine tune if necessary.

#### • Adjusting the horizontal distortion compensation for green

No.	Adjustment items	Section to be adjusted	Adjusting method
1	(G) H—SKEW	VR526	Match the vertical green line to the center of the crosshatch screen to make a straight line without distortion or inclination.
2	(G) H—BOW	VR525	
3	Repeat Adjustments 1 and 2.		
4	(G) H—KEY	VR524	Match the vertical green line to the left and right sides of the crosshatch screen to make a straight line without inclination.
5	(G) H—S—KEY	VR523	
6	Repeat Adjustments 4 and 5.		



## • Adjusting the horizontal spacing compensation for green

No.	Adjustment items	Section to be adjusted	Adjusting method
7	PIN	VR571	Match the vertical green line to the left and right sides of the cross hatch screen to make a straight line without distortion.
8	(G) H-PIN	VR522	
9	(G) H-S-PIN	VR521	
10	(G) H-S-PIN-R	VR520	
11	(G) H-S-PIN-L	VR519	
12	Repeat Adjustments 7 to 11.		
13	(G) S-PIN	VR573	

## • Adjusting the horizontal spacing compensation for green

No.	Adjustment items	Section to be adjusted	Adjusting method
14	(G) H—STATIC	LEFT or RIGHT key (S512 or S508)	Match the vertical green line to the center of the crosshatch screen. (This line is used as the standard position for STATIC. Pay attention to this position while changing the position in the subsequent adjustments.)
15	(G) H—SIZE	VR514	Match the vertical green line spacing to the left and right sides of the crosshatch screen to make an even straight line without distortion.
16	(G) H—LIN	VR518	
17	(G) H—S—LIN	VR517	
18	(G) H—S—LIN—R	VR516	
19	(G) H—S—LIN—L	VR515	
20	Repeat Adjustments 14 to 19.		
21	Repeat Adjustments 1 to 20.		

**• Adjusting the vertical distortion compensation for green**

No.	Adjustment items	Section to be adjusted	Adjusting method
1	(G) V-SKEW	VR559	Match the horizontal green line to the center of the crosshatch screen to make a straight line without distortion or inclination.
2	(G) V-BOW	VR558	
3	Repeat Adjustments 1 and 2.		
4	(G) V-KEY	VR557	Match the horizontal green line to the top and bottom sides of the crosshatch screen to make a straight line without distortion or inclination.
5	(G) V-S-KEY	VR556	
6	(G) V-PIN	VR553	
7	(G) V-S-PIN	VR552	
8	(G) V-WAVE	VR555	
9	(G) V-S-WAVE	VR554	
10	PIN	VR572	
11	Repeat Adjustments 4 to 10.		

**• Adjusting the vertical spacing compensation for green**

No.	Adjustment items	Section to be adjusted	Adjusting method
12	(G) V—STATIC	UP or DOWN key (S511 or S509)	Match the horizontal green line to the center of the crosshatch screen. (This line is used as the standard position for STATIC. Pay attention to this position while changing the position in the subsequent adjustments.)
13	(G) V—LIN	VR551	Match the horizontal green line spacing to the left and right sides of the crosshatch screen to make an even straight line without distortion.
14	(G) V—SIZE	VR550	
15	Repeat Adjustments 12 to 14.		
16	Repeat Adjustments 1 to 15.		

## (2) Adjusting the red line

- Turn on the GREEN and RED switches of the control box to display the green and red lines only on the screen.
- Match the red line onto the green line to make a yellow line using each VR.
- After adjusting each item is completed, reconfirm the green line by viewing the entire screen. Fine tune if necessary.

### • Adjusting the horizontal distortion compensation for red

No.	Adjustment items	Section to be adjusted	Adjusting method
1	(R) H-SKEW	VR513	Match the vertical red line to the center of the crosshatch screen to make a straight line without distortion or inclination.
2	(R) H-BOW	VR512	
3	Repeat Adjustments 1 and 2.		
4	(R) H-KEY	VR511	Match the vertical red line to the left and right sides of the crosshatch screen to make a straight line without inclination.
5	(R) H-S-KEY	VR510	
6	Repeat Adjustments 4 and 5.		
7	(R) H-PIN	VR509	Match the vertical red line to the left and right sides of the cross hatch screen to make a straight line without distortion.
8	(R) H-S-PIN	VR508	
9	(R) H-S-PIN-R	VR507	
10	(R) H-S-PIN-L	VR506	
11	Repeat Adjustments 7 to 11.		

### • Adjusting the horizontal spacing compensation for red

No.	Adjustment items	Section to be adjusted	Adjusting method
12	(R) H—STATIC	LEFT or RIGHT key (S512 or S508)	Match the vertical red line to the vertical green line at the center of the crosshatch screen to make a yellow line. (This line is used as the standard position for STATIC. Pay attention to this position while changing the position in the subsequent adjustments.)
13	(R) H—SIZE	VR501	Match the vertical red line to the green line on the left and right sides of the crosshatch screen to make a yellow line.
14	(R) H—LIN	VR505	
15	(R) H—S—LIN	VR504	
16	(R) H—S—LIN—R	VR503	
17	(R) H—S—LIN—L	VR502	
18	Repeat Adjustments 12 to 17.		
19	Repeat Adjustments 1 to 18.		

• **Adjusting the vertical distortion compensation for red**

No.	Adjustment items	Section to be adjusted	Adjusting method
1	(R) V-SKEW	VR549	Match the horizontal red line to the center of the crosshatch screen to make a straight line without distortion or inclination.
2	(R) V-BOW	VR548	
3	Repeat Adjustments 1 and 2.		
4	(R) V-KEY	VR547	Match the horizontal red line to the top and bottom sides of the crosshatch screen to make a straight line without distortion or inclination.
5	(R) V-S-KEY	VR546	
6	(R) V-PIN	VR543	
7	(R) V-S-PIN	VR542	
8	(R) V-WAVE	VR545	
9	(R) V-S-WAVE	VR544	
10	Repeat Adjustments 4 to 9.		

• **Adjusting the vertical spacing compensation for red**

No.	Adjustment items	Section to be adjusted	Adjusting method
11	(R) V—STATIC	UP or DOWN key (S511 or S509)	Match the horizontal red line to the horizontal green line at the center of the crosshatch screen to make a yellow line. (This line is used as the standard position for STATIC. Pay attention to this position while changing the position in the subsequent adjustments.)
12	(R) V—LIN	VR541	Match the horizontal red line to the horizontal green line on the left and right sides of the crosshatch screen to make a yellow line.
13	(R) V—SIZE	VR540	
14	Repeat Adjustments 11 to 13.		
15	Repeat Adjustments 1 to 14.		

(3) **Adjusting the blue line**

- Turn on the GREEN and BLUE switches of the control box to display the green and blue lines only on the screen.
- Match the blue line onto the green line to make a cyan line using each VR.
- After adjusting each item is completed, reconfirm the green line by viewing the entire screen. Fine tune if necessary.

• **Adjusting the horizontal distortion compensation for blue**

No.	Adjustment items	Section to be adjusted	Adjusting method
1	(B) H—SKEW	VR539	Match the vertical blue line to the center of the crosshatch screen to make a straight line without distortion or inclination.
2	(B) H—BOW	VR538	
3	Repeat Adjustments 1 and 2.		

• **Adjusting the horizontal distortion compensation for blue**

No.	Adjustment items	Section to be adjusted	Adjusting method
4	(B) H – KEY	VR537	Match the vertical blue line to the left and right sides of the crosshatch screen to make a straight line without inclination.
5	(B) H – S – KEY	VR536	
6	Repeat Adjustments 4 and 5.		
7	(B) H – PIN	VR535	Match the vertical blue line to the left and right sides of the cross hatch screen to make a straight line without distortion.
8	(B) H – S – PIN	VR534	
9	(B) H – S – PIN – R	VR533	
10	(B) H – S – PIN – L	VR532	
11	Repeat Adjustments 7 to 10.		

• **Adjusting the horizontal spacing compensation for blue**

No.	Adjustment items	Section to be adjusted	Adjusting method
12	(B) H-STATIC	LEFT or RIGHT key (S512 or S508)	Match the vertical blue line to the vertical green line at the center of the crosshatch screen to make a cyan line. (This line is used as the standard position for STATIC. Pay attention to this position while changing the position in the subsequent adjustments.)
13	(B) H-SIZE	VR527	Match the vertical blue line to the green line on the left and right sides of the crosshatch screen to make a cyan line.
14	(B) H-LIN	VR531	
15	(B) H-S-LIN	VR530	
16	(R) H-S-LIN-R	VR529	
17	(B) H-S-LIN-L	VR528	
18	Repeat Adjustments 12 to 17.		
19	Repeat Adjustments 1 to 18.		



• **Adjusting the vertical distortion compensation for blue**

No.	Adjustment items	Section to be adjusted	Adjusting method
1	(B) V – SKEW	VR569	Match the horizontal blue line to the center of the crosshatch screen to make a straight line without distortion or inclination.
2	(B) V – BOW	VR568	
3	Repeat Adjustments 1 and 2.		
4	(B) V – KEY	VR567	Match the horizontal blue line to the top and bottom sides of the crosshatch screen to make a straight line without distortion or inclination.
5	(B) V – S – KEY	VR566	
6	(B) V – PIN	VR563	
7	(B) V – S – PIN	VR562	
8	(B) V – WAVE	VR565	
9	(B) V – S – WAVE	VR564	
10	Repeat Adjustments 4 to 9.		

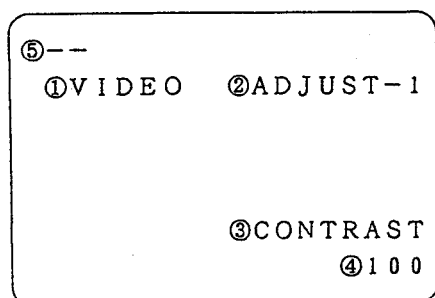
• **Adjusting the vertical spacing compensation for blue**

No.	Adjustment items	Section to be adjusted	Adjusting method
11	(B) V—STATIC	UP or DOWN key (S511 or S509)	Match the horizontal blue line to the horizontal green line at the center of the crosshatch screen to make a cyan line. (This line is used as the standard position for STATIC. Pay attention to this position while changing the position in the subsequent adjustments.)
12	(B) V—LIN	VR561	Match the horizontal blue line to the horizontal green line on the left and right sides of the crosshatch screen to make a cyan line.
13	(B) V—SIZE	VR560	
14	Repeat Adjustments 11 to 13.		
15	Repeat Adjustments 1 to 14.		

## 8.5 ADJUSTING THE PICTURE QUALITY WITH THE CONTROL BOX

### 8.5.1 Operation procedures

- Before adjustment, select the white balance (1 or 2) to adjust and the multi-mode (ON or OFF) using the switch on the rear panel.
- Set the KEY LOCK switch to OFF. The screen display is shown below. The display contents of ② differ depending on the position of the ADJ.MODE switch.



#### ① VIDEO

Displays the position of the input change switch.  
(VIDEO, Y/C, RGB)

#### ② ADJUST-1

Displays ADJ.MODE.  
(ADJUST-1, ADJUST-2, ADJUST-3)

#### ③ CONTRAST

Displays the adjustment item.

CONTRAST (for ADJUST-1)  
RED-HIGH (for ADJUST-2)  
CONV-RV (for ADJUST-3)

#### ④ 100

Displays the adjusted value.  
(MIN, 1, 2, 3, ..... 252, 253, 254, MAX)

#### ⑤ --

Displays the ID.  
(Used during computer control)

- Select the adjustment item using the ADJ.MODE switch and SELECT key.
- Adjust the picture quality using the UP, DOWN, RIGHT, or LEFT key. (RIGHT and LEFT keys are available only for ADJ.MODE3.)
- After the adjustment is completed, turn the KEY LOCK switch on. The adjusted values are memorized.

Note :

- Adjust the picture quality for WHITE BAL. 1, WHITE BAL. 2, MULTI-ON, and MULTI-OFF, respectively.
- To recover the prior state during adjustment, turn the KEY LOCK switch off and disconnect the power cable.
- To set the value adjusted before delivery, press the STD key.
- To change the value adjusted before delivery, simultaneously press the FAST and STD keys after adjustment.

Name	Operation
BLUE	Turns the blue signal on/off.
GREEN	Turns the green signal on/off.
RED	Turns the red signal on/off.
COLOR	Turns color on/off. (OFF for black and white).
TEST	Turns the test cross pattern signal on/off.
KEY LOCK	Deactivates other keys when turned on. Set to ON for adjustment.
ADJ. MODE	Selects the adjustment mode.
SELECT	Selects the adjustment item. (See Page 93.)
UP	Increases the adjusted value by one step. Used to adjust the vertical static convergence.
DOWN	Decreases the adjusted value by one step. Used to adjust the vertical static convergence.
LEFT	Used to adjust the horizontal static convergence.
RIGHT	Used to adjust the horizontal static convergence.
FAST	Increases the change of data by ten times when pressed together with the UP, DOWN, LEFT, or RIGHT key.
STD	Returns to the standard state. (Factory adjustment)

Control box switch/key operation

## Selecting the Adjustment Item with the SELECT Key

### ADJUST MODE 1

- • CONTRAST: Contrast (video) adjustment
- BRIGHTNESS: Brightness adjustment
- COLOR: Color (color density) adjustment
- TINT: Tint (hue) adjustment
- SHARPNESS: Sharpness adjustment

### ADJUST MODE 2

#### COMBINATION OFF

- • RED-HIGH: Red high-light adjustment
- RED-LOW: Red low-light adjustment
- BLUE-HIGH: Blue high-light adjustment
- BLUE-LOW: Blue low-light adjustment

#### COMBINATION ON

- • RED-HIGH: Red high-light adjustment
- RED-LOW: Red low-light adjustment
- BLUE-HIGH: Blue high-light adjustment
- BLUE-LOW: Blue low-light adjustment
- ABL LEVEL: ABL offset adjustment during interlocking operation

### ADJUST MODE 3

(LEFT and RIGHT switches are available only for ADJUST MODE 3.)

- • CONVERGENCE RED: Red static convergence adjustment
- CONVERGENCE GREEN: Green static convergence adjustment
- CONVERGENCE BLUE: Blue static convergence adjustment

When the KEY LOCK switch is turned on, the adjusted values are memorized. Regardless of other switch positions, the screen has the following attributes:

Color: ON  
 RGB: ON  
 Test signal: OFF

## 8.5.2 Adjustment item

Operation mode	WHITE BAL. 1		WHITE BAL. 2	
	MULTI-ON	MULTI-OFF	MULTI-ON	MULTI-OFF
Adjustment item	CONTRAST-1		CONTRAST-2	
	BRIGHTNESS-1		BRIGHTNESS-2	
	COLOR-1		COLOR-2	
	TINT-1		TINT-2	
	SHARPNESS-A	SHARPNESS-B	SHARPNESS-A	SHARPNESS-B
	RED-HIGH-1		RED-HIGH-2	
	RED-LOW-1		RED-LOW-2	
	BLUE-HIGH-1		BLUE-HIGH-2	
	BLUE-LOW-1		BLUE-LOW-2	
	CONV. RED-V			
	CONV. RED-H			
	CONV. GRN-V			
	CONV. GRN-H			
	CONV. BLU-V			
	CONV. BLU-H			

- Convergence is adjusted in any one mode.
- The items with -1 and -2 are adjusted for each position of WHITE BAL. 1 and WHITE BAL. 2.
- SHARPNESS is adjusted for each position of WHITE BAL. 1, WHITE BAL. 2, MULTI-ON, and MULTI-OFF.
- The adjustment value (the number displayed on the screen) differs depending on the individual set. Use the value as the adjustment guideline.

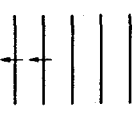
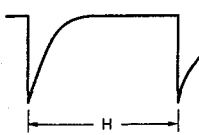
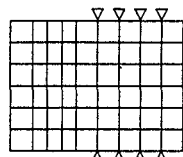
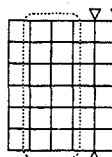
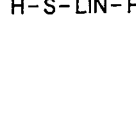
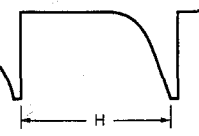
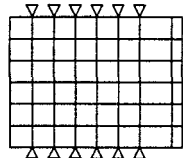
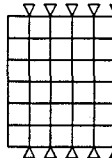
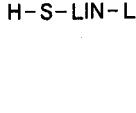
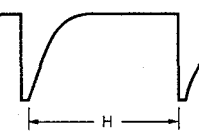
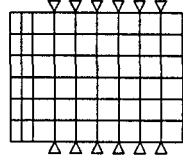
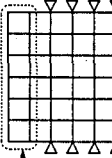
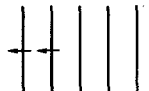
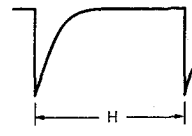
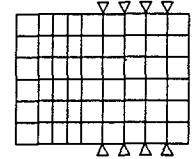
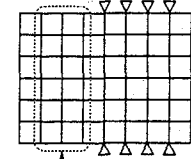
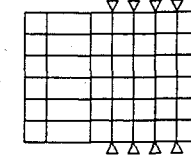
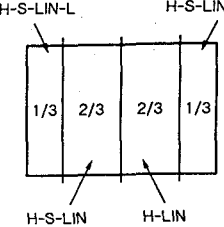
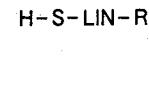
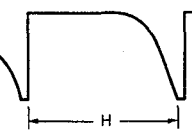
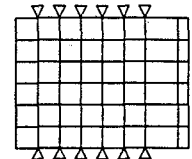
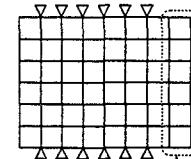
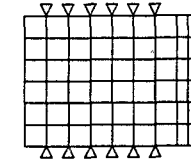
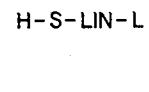
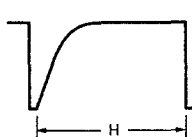
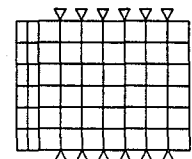
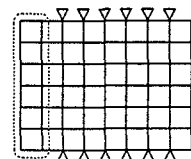
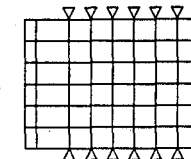
Compensation	Signal and Mark * 1	Compensating Signal	Distorted Screen	Corrected
Horizontal interval compensation	H-S-LIN 	 H sine wave		 Attention point
	H-S-LIN-R 	 1/4H parabolic wave		 Att
	H-S-LIN-L 	 1/4H parabolic wave		 Attention point

Fig. 8-6-1

Compensation	Signal and Mark * 1	Compensating Signal	Distorted Screen	Corrected Screen	Distorted Screen	Adjustment Point
Horizontal interval compensation	H-S-LIN 	 H sine wave		 Attention point		Pay attention to the intervals of the vertical lines in that portion about 2/3 from the center to the left end of the screen, and equalize the intervals to overlay the green lines. 
	H-S-LIN-R 	 1/4H parabolic wave		 Attention point		Pay attention to the intervals of the vertical lines in that portion about 1/3 from the right end of the screen to the center, and equalize the intervals to overlay the green lines.
	H-S-LIN-L 	 1/4H parabolic wave		 Attention point		Pay attention to the intervals of the vertical lines in that portion about 1/3 from the left end of the screen to the center, and equalize the intervals to overlay the green lines.

Note: KEY is short for KEYSTONE, and LIN for LINEARITY  
 ▽: denotes points which do not move  
 ▼: denotes points which hardly move  
 \* 1: Sketch is printed on the p.c. board.

Fig. 8-6-1 Horizontal compensation adjustment



Compensation	Signal and Mark * 1	Compensating Signal	Distorted Screen	Corrected Screen	Distorted Screen	Adjustment Point	
Horizontal distortion compensation	H-SKEW 	 V sawtooth wave		 Attention point		Observe the vertical lines in the center of the screen (where there is no H-KEY, H-S-KEY, H-PIN nor H-S-PIN movement), then adjust the vertical lines to eliminate lean.	To obtain the best possible lines, adjust the vertical lines in the center of the screen following the adjustment procedure of H-SKEW and H-BOW.
	H-BOW 	 V parabolic wave		 Attention point		Observe the vertical lines in the center of the screen, then adjust the bowed lines to straight lines.	
	H-KEY 	 V		 Attention point		Observe the vertical lines in the right section of the screen (where there is no H-S-KEY movement), then adjust the vertical lines to eliminate lean.	To eliminate lean, adjust the vertical lines in the right and left sections of the screen following the adjustment procedure of H-KEY and H-S-KEY.
	H-S-KEY 	 V		 Attention point		Observe the vertical lines in the left section of the screen, then adjust the vertical lines to eliminate lean.	
	H-PIN 	 V parabolic wave x H sawtooth wave		 Attention point		Pay attention to the vertical lines in that about 2/3 portion of the half screen to the right of the center, and straighten the curved lines.	Adjust that about 2/3 portion of the half screen to the right of the center with the H-PIN, and adjust that about 2/3 portion of the half screen to the left of the center with the H-S-PIN.
	H-S-PIN 	 V parabolic wave x 1/2 H sawtooth wave		 Attention point		Pay attention to the vertical lines in that about 2/3 portion of the half screen to the left of the center, and straighten the curved lines.	

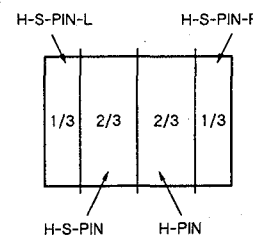
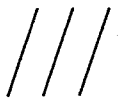
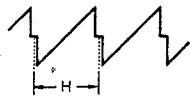
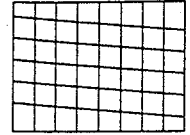
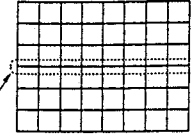
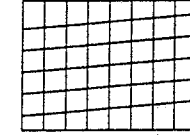

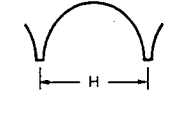
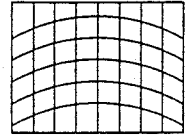
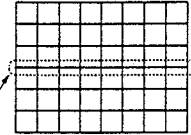
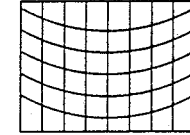

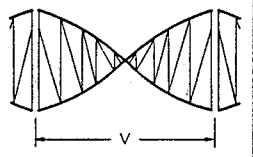
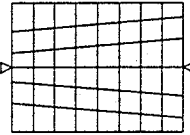
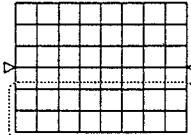
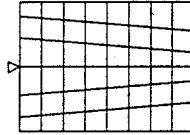

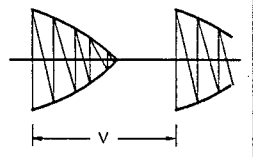
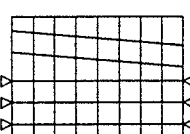
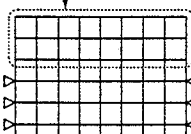
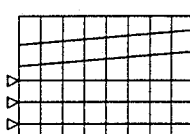
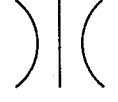
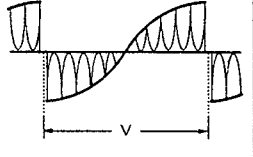
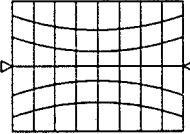
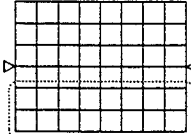
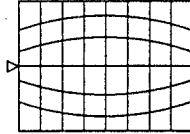
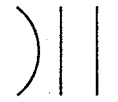
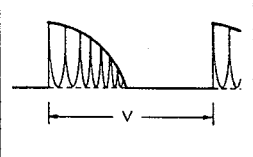
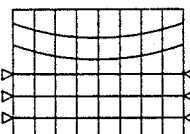
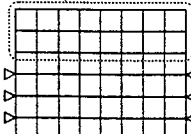
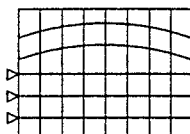


Fig. 8-6-2 Horizontal compensation adjustment

Compensation	Signal and Mark * 1	Compensating Signal	Distorted Screen	Corrected Screen	Distorted Screen	Adjustment Point	
Horizontal distortion compensation	H-S-PIN-R	 V parabolic wave × 1/4H sawtooth wave				Pay attention to that portion about 1/3 from the right end of the screen to the center, and adjust to straighten the line.	 H-S-PIN-L      H-S-PIN-R 1/3   2/3   2/3   1/3 H-S-PIN      H-PIN
	H-S-PIN-L	 V parabolic wave × 1/4H sawtooth wave				Pay attention to that portion about 1/3 from the left end of the screen to the center, and adjust to straighten the line.	
	S-S-PIN					Pay attention to the vertical lines at the ends of the left and right portions on the screen (with a change in that one line portion outside the crosshatch), and adjust to straighten the lines.	
Horizontal interval compensation	H-STATIC	DC voltage				The vertical lines of the screen move parallel on the right and left by the convergence control of the remote control. When the vertical line moves at will, consider the degree of movement.	 H-S-LIN-L      H-S-LIN-R 1/3   2/3   2/3   1/3 H-S-LIN      H-LIN
	H-LIN	 H parabolic wave				Pay attention to the intervals of the vertical lines in that portion about 2/3 from the center to the right end of the screen, and equalize the intervals to overlay the green lines.	
	H-SIZE	 H sawtooth wave				Converge the vertical lines in the right and left sections of the screen into green lines.	

Fig. 8-6-3 Horizontal compensation adjustment

Compensation	Signal and Mark * 1	Compensating Signal	Distorted Screen	Corrected Screen	Distorted Screen	Adjustment Point	
Vertical distortion compensation	V-SKEW 	H sawtooth wave 		 Attention point		Observe the horizontal lines in the center of the screen (where there is no V-KEY, V-S-KEY nor V-PIN movement), then adjust the horizontal lines to eliminate lean.	To obtain the best possible lines, adjust the horizontal lines in the center of the screen following the adjustment procedure of V-SKEW and V-BOW.
	V-BOW 	H parabolic wave 		 Attention point		Observe the horizontal lines in the center of the screen, then adjust the bowed lines to straight lines.	
	V-KEY 			 Attention point		Observe the horizontal lines in the lower section of the screen (where there is no V-S-KEY movement), then adjust the horizontal lines to eliminate lean.	To eliminate lean, adjust the horizontal lines in the upper and lower sections of the screen following the adjustment procedure of V-KEY and V-S-KEY.
	V-S-KEY 			 Attention point		Observe the horizontal lines in the upper of the screen, then adjust the horizontal lines to eliminate lean.	
	V-PIN 			 Attention point		Observe the horizontal lines in the lower of the screen, then adjust the bowed lines to straight lines.	To eliminate distortion, straighten the horizontal lines in the upper and lower sections of the screen following the adjustment procedure of V-PIN and V-S-PIN.
	V-S-PIN 			 Attention point		Observe the horizontal lines in the upper of the screen, then adjust the bowed lines to straight lines.	

Note: KEY is short for KEYSTONE, and LIN for LINEARITY  
 ▽: denotes points which do not move  
 ▼: denotes points which hardly move  
 \* 1: Sketch is printed on the p.c. board.

Fig. 8-7-1 Vertical compensation adjustment

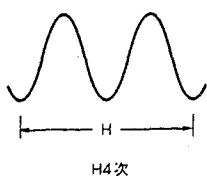
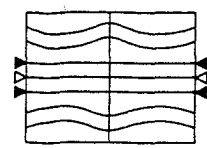
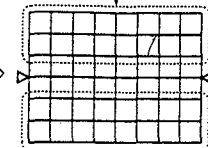
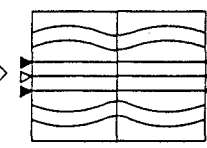
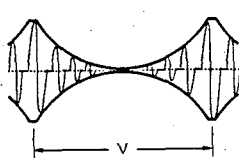
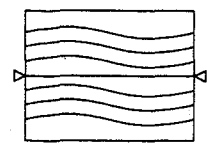
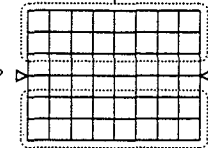
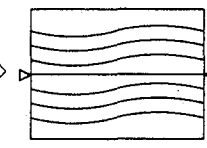
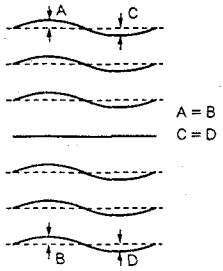
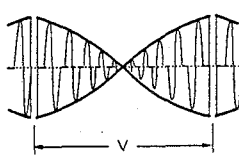
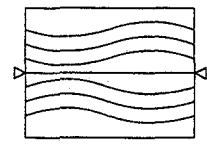
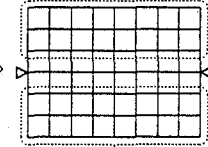
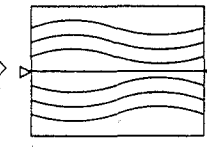
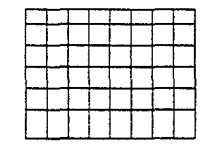
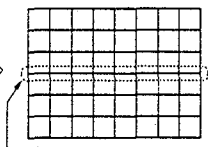
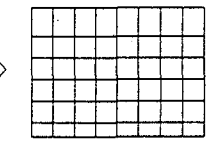
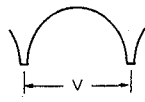
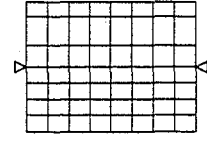
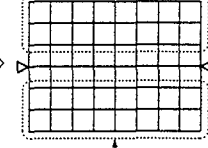
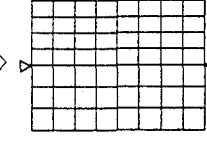
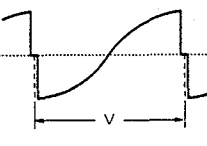
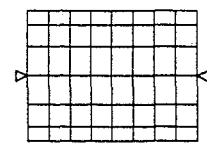
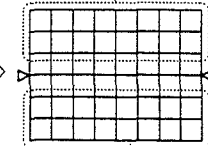
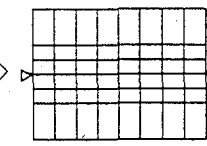
Compensation	Signal and Mark *1	Compensating Signal	Distorted Screen	Corrected Screen	Distorted Screen	Adjustment Point
Vertical interval compensation	PIN (V)					Observe the horizontal lines in the upper and lower sections of the screen, then adjust the horizontal lines to straight lines.
	V-S-WAVE					Adjust as shown in the diagram below with the V-S-WAVE.  A = B C = D
	V-WAVE					Then, adjust with the V-WAVE to straighten the horizontal lines.
	V-STATIC	DC voltage				Converge the horizontal lines in the center of the screen into green lines by the convergence control of the remote control. When the horizontal line moves at will, consider the degree of movement.
	V-LIN	 V parabolic wave				Adjust the intervals of the horizontal lines in both the upper and lower portions of the screen to be equal.
	V-SIZE	 V sawtooth wave				Converge the horizontal lines in the upper and lower sections of the screen into green lines.

Fig. 8-7-2 Vertical compensation adjustment

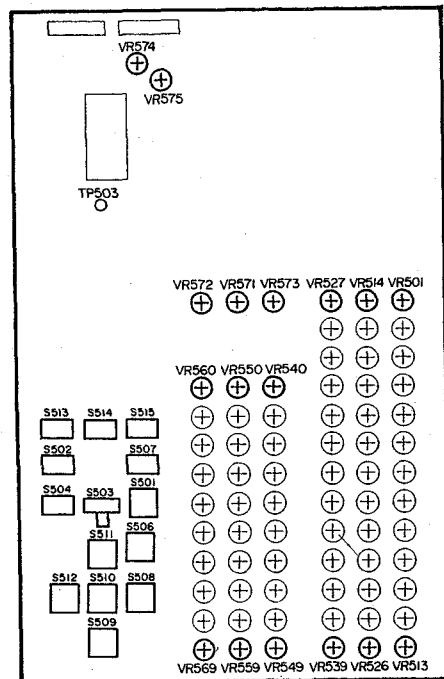
A

B

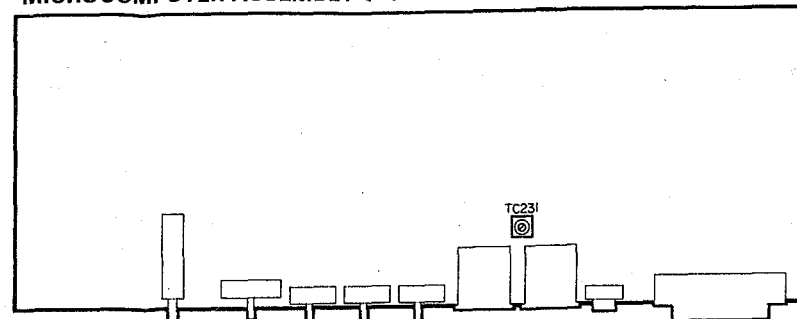
C

D

CONTROL ASSEMBLY [C]



MICROCOMPUTER ASSEMBLY [M]

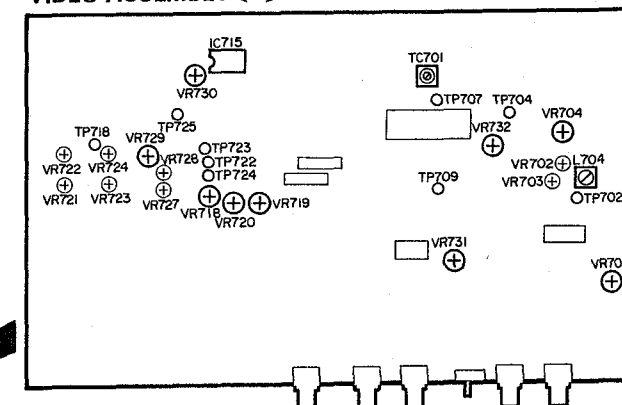


Deflection yoke

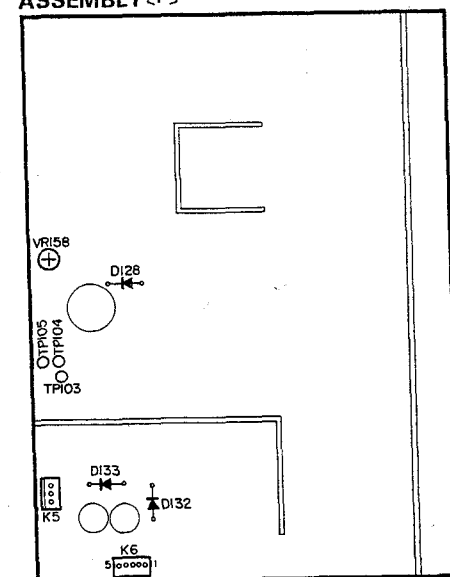
Centering magnet  
(Turn in either direction until cross signal becomes white)

FOCUS VR ASSEMBLY [VR1]

VIDEO ASSEMBLY [V]



CONVERGENCE AMP/POWER SUPPLY ASSEMBLY [P]



DEFLECTION ASSEMBLY [D]

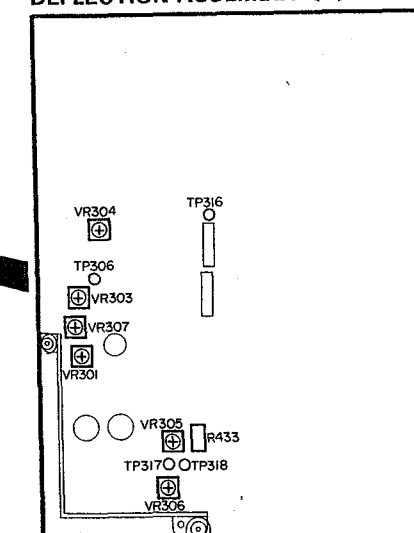


Fig. 8-8 Adjustment location



9. REPLACING THE CRT ASSEMBLY

A    **Serviceman Warning**

When replacing the CRT assembly, turn off the power, unplug the AC plug and let the unit discharge for more than 1 minute.

The anode cables of the CRT assembly R, G and B in PROJECTION UNIT are connected in series.

When replacing the CRT assembly, the anode cable have to be cut.

Note: Since the anode cables for the CRT assembly to service supplies are only available in half lengths, either cut longer lengths, or join older lengths of cable to ensure that the original cable length is used.

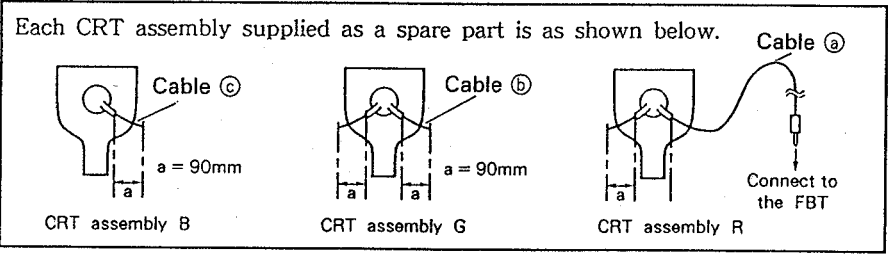
Table 9-1    Cable disconnecting method

Cable	Replacement CRT assembly		
	When CRT assembly B is replaced,	When CRT assembly G is replaced,	When CRT assembly R is replaced,
Cable ①			Disconnect the anode cable from the FBT. (Refer to section "8.3.1 Anode cable connection and disconnection")
Cable ②	Leave as is.	Cut a place 20mm from the exact center towards the CRT assembly G.	Cut a place 20mm from the exact center towards the CRT assembly R.
Cable ③	Cut a place 20mm from the exact center towards the CRT assembly B.	Cut a place 20mm from the exact center towards the CRT assembly G.	Leave as is.

Note : Do not cut other cables by mistake.

9.1 WHEN REPLACING THE CRT ASSEMBLY

Each CRT assembly supplied as a spare part is as shown below.



## 9.2 ANODE CABLE SHEATH PEELING

- Peel the sheath of the end of cut anode cable and new anode cable are as follows.
- The anode cable structure is outlined in Fig. 9-2.
- Note that the sheath consists of two layers.
- The method used to peel the sheath back is illustrated in Fig. 9-3. Use a cutter knife, taking care not to damage the core leads.

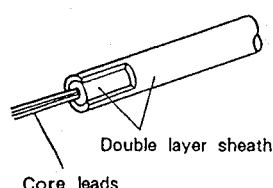


Fig. 9-2 Anode cable structure

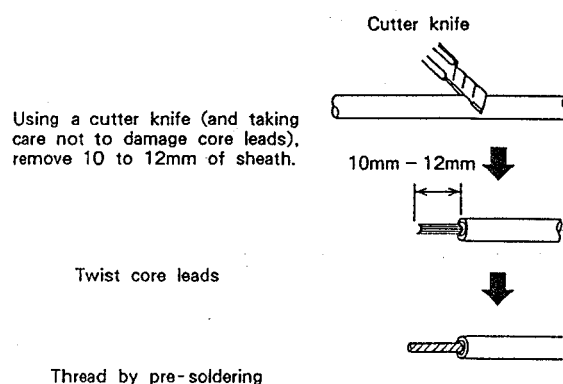


Fig. 9-3 Anode cable sheath peeling

## 9.3 ANODE CABLE JOINING PROCEDURE

- Join the cut anode cable and the new anode cable to be restored. Also, when replacing the FBT, refer to section "8.3.1 Anode cable connection and disconnection".
- Slip two silicon tubes (silicon tubes A and B in Fig. 9-4) onto the anode cables before making the join.
- Leave the silicon adhesive to harden overnight.
- The silicon adhesive is applied to guard the cable core leads from external air. Apply binder liberally. After completing the joint (at step ⑩ in Fig. 9-4-1 thru 3), make a hole in the silicon adhesive and check that the tube interior cannot be seen.

### CAUTION:

For the silicon adhesive, be sure to use silicon adhesive part No. GYL-017.

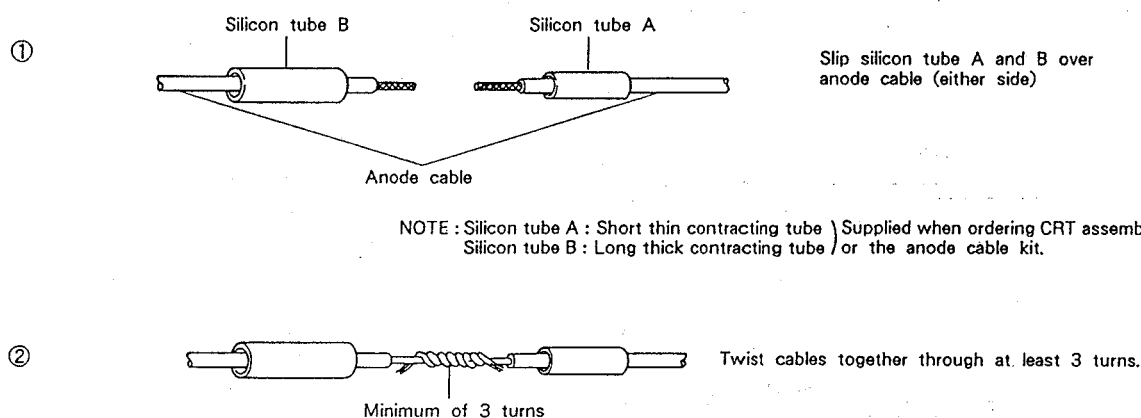


Fig.9-4-1 Anode cable joining procedure (1)

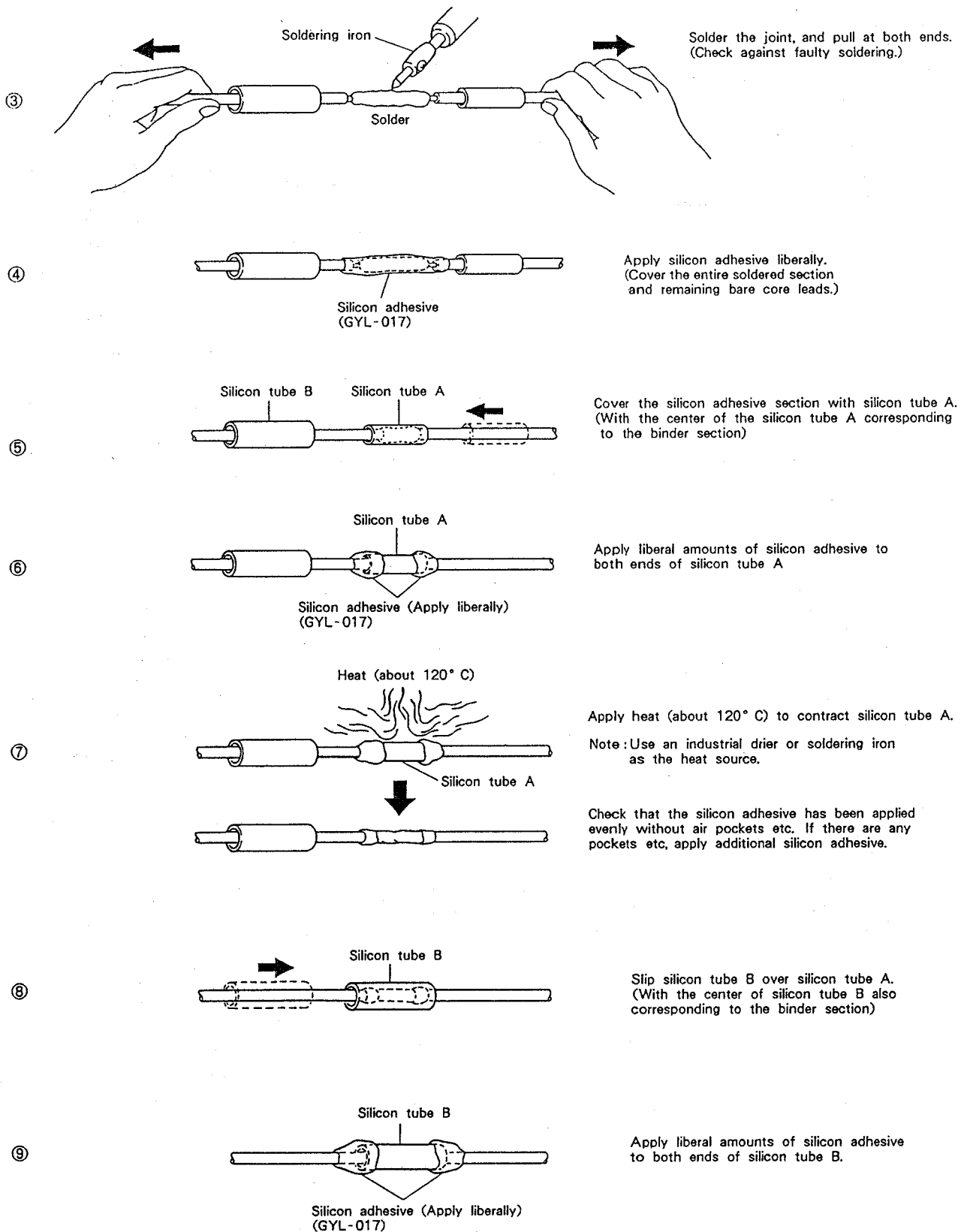
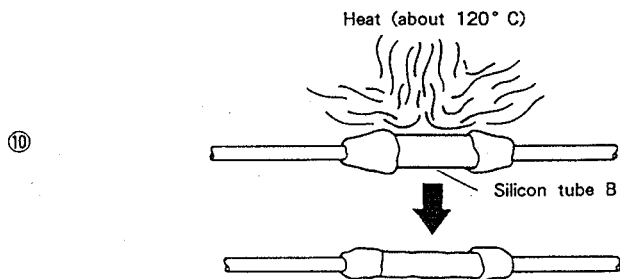
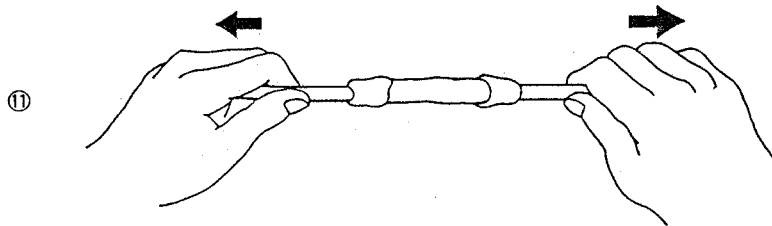


Fig.9-4-2 Anode cable joining procedure (2)



Apply heat (about 120° C) to contract silicon tube B.  
Note: Use an industrial drier or soldering iron as the heat source.

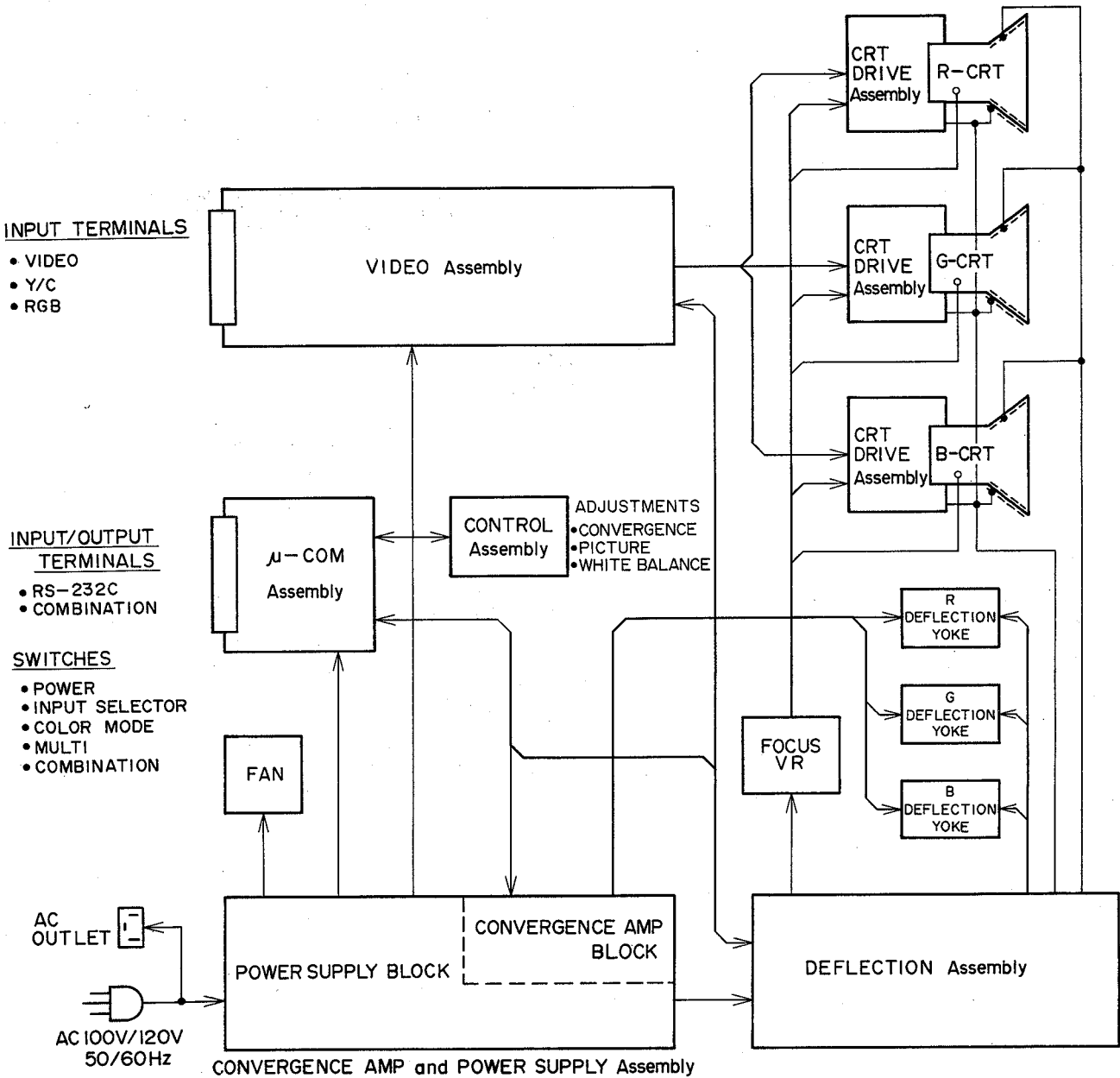
Check that the silicon adhesive has been applied evenly without air pockets etc. If there are any pockets etc, apply additional silicon adhesive.



Gently tug both ends to check that the cables do not separate.

Fig.9-4-3 Anode cable joining procedure (3)

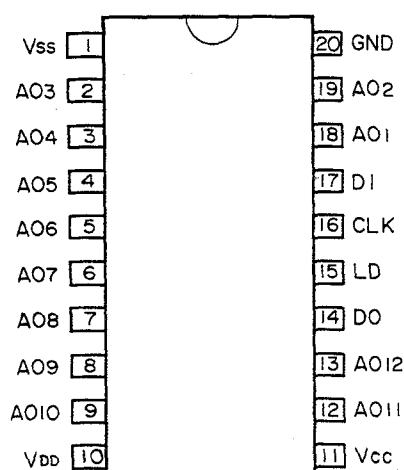
# 10. BLOCK DIAGRAM



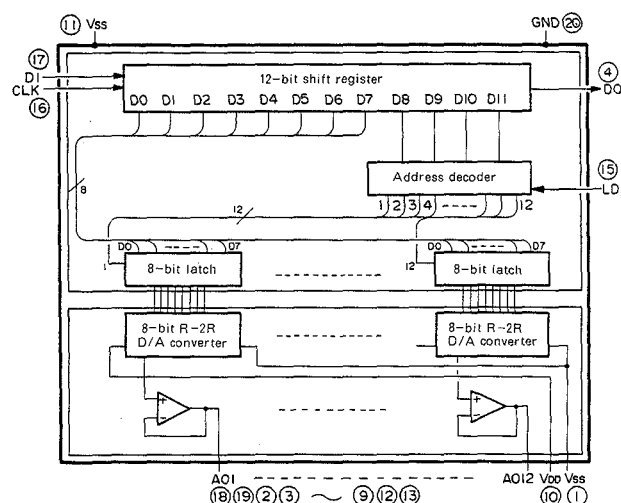
# 11. IC INFORMATION

## ■ IC238, IC239 (MB88346P—G) : D/A CONVERTER

### • Pin Assignment



### • Block Diagram



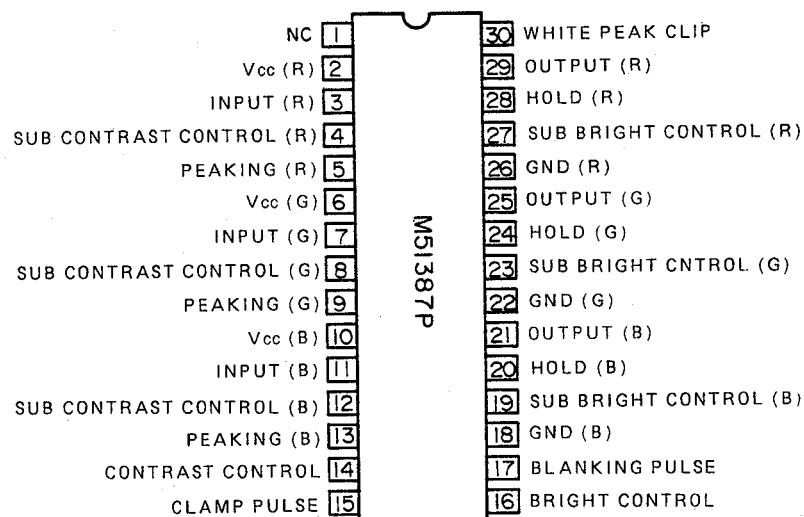
### • Pin Function

No.	Pin name	I/O	Description
1	V <sub>SS</sub>	—	D/A converter GND terminal
2	AO <sub>3</sub>	O	8-bit D/A data output through OP amp
3	AO <sub>4</sub>		
4	AO <sub>5</sub>		
5	AO <sub>6</sub>		
6	AO <sub>7</sub>		
7	AO <sub>8</sub>		
8	AO <sub>9</sub>		
9	AO <sub>10</sub>		
10	V <sub>DD</sub>	—	D/A converter power supply terminal
11	V <sub>CC</sub>	—	Power supply terminal of MCU interface and OP amp
12	AO <sub>11</sub>	O	8-bit D/A data output through OP amp
13	AO <sub>12</sub>		
14	DO	O	Bit data of MSB of 12-bit shift register is output
15	LD	I	When a high-level signal is input to the LD terminal, the value of the 12-bit shift register is loaded onto decoder and D/A output register
16	CLK	I	Shift clock input terminal. Upon rise of the shift clock, input signal from DI terminal is input to 12-bit shift register
17	DI	I	Serial data input terminal. Serial data of 12-bit data length is input
18	AO <sub>1</sub>	O	8-bit D/A data output through OP amp
19	AO <sub>2</sub>		
20	GND	—	GND terminal of MCU interface and OP amp

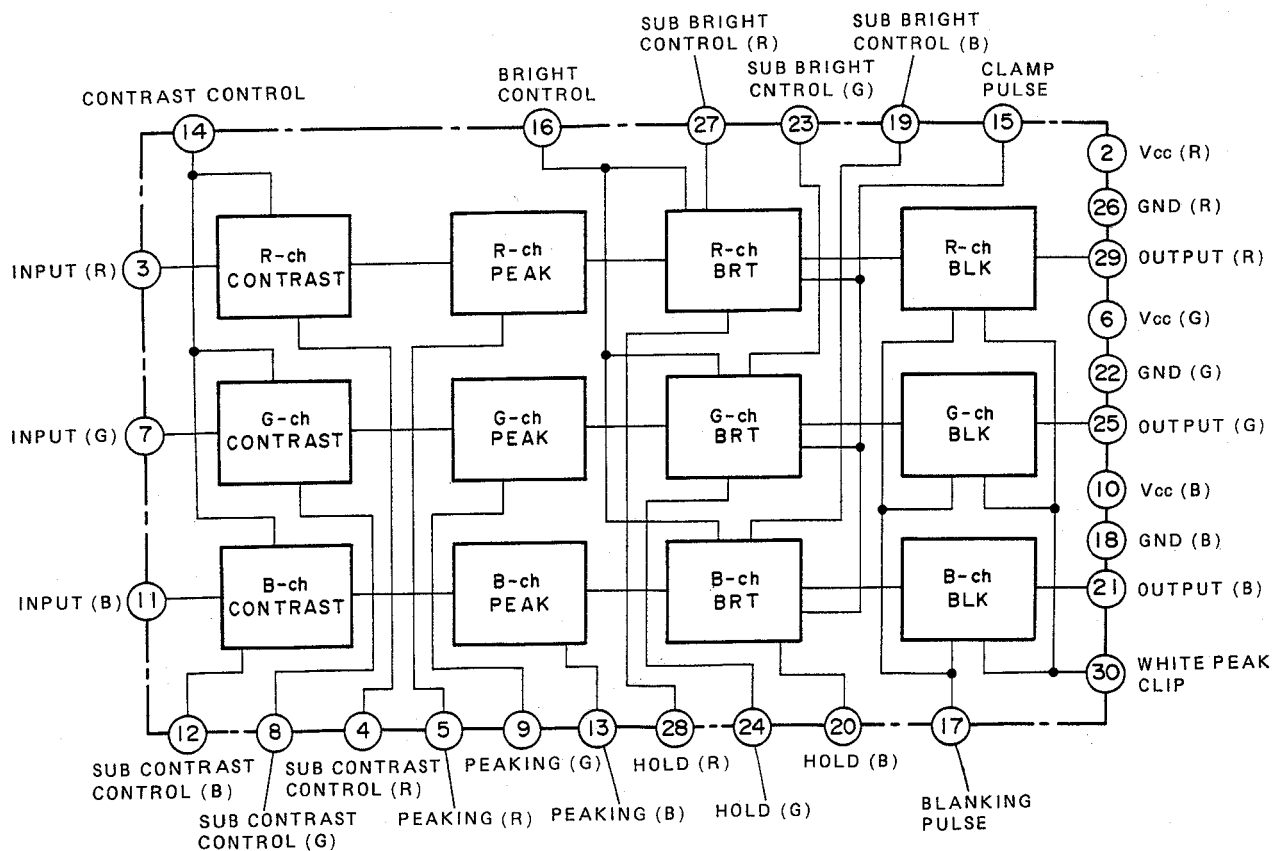


## IC708 (M51387P) : 3CH VIDEO AMP

### • Pin Assignment

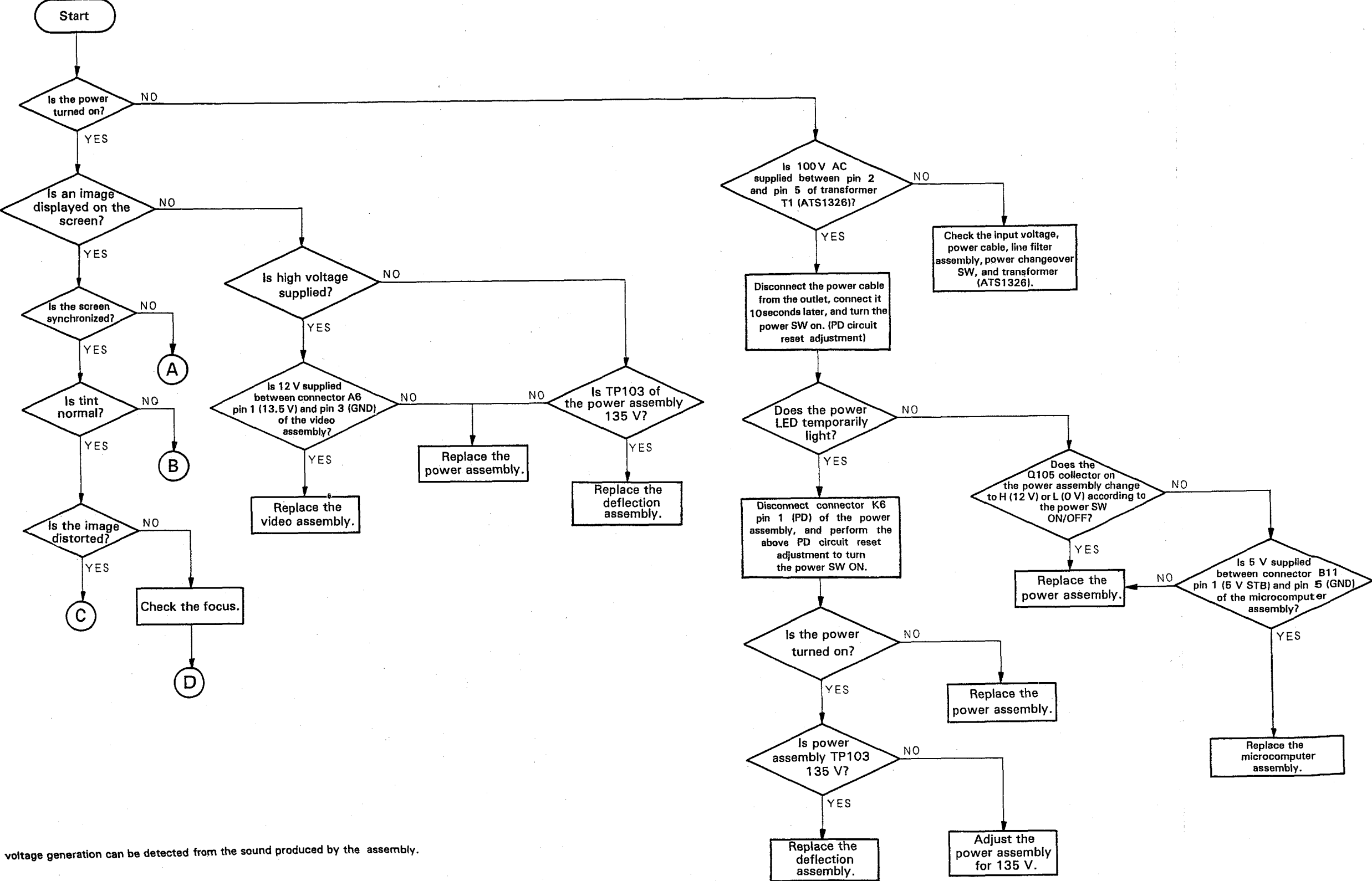


### • Block Diagram

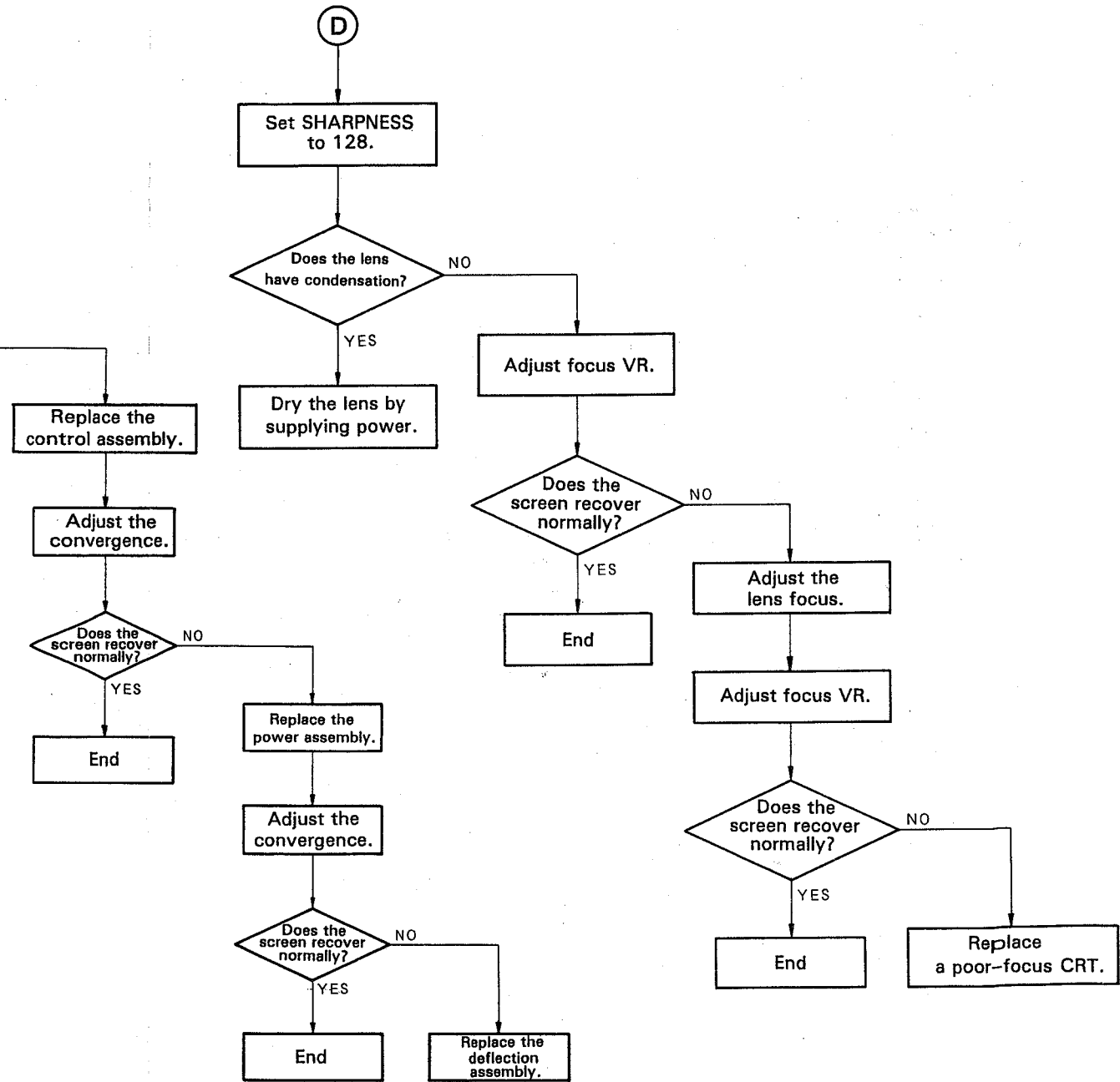
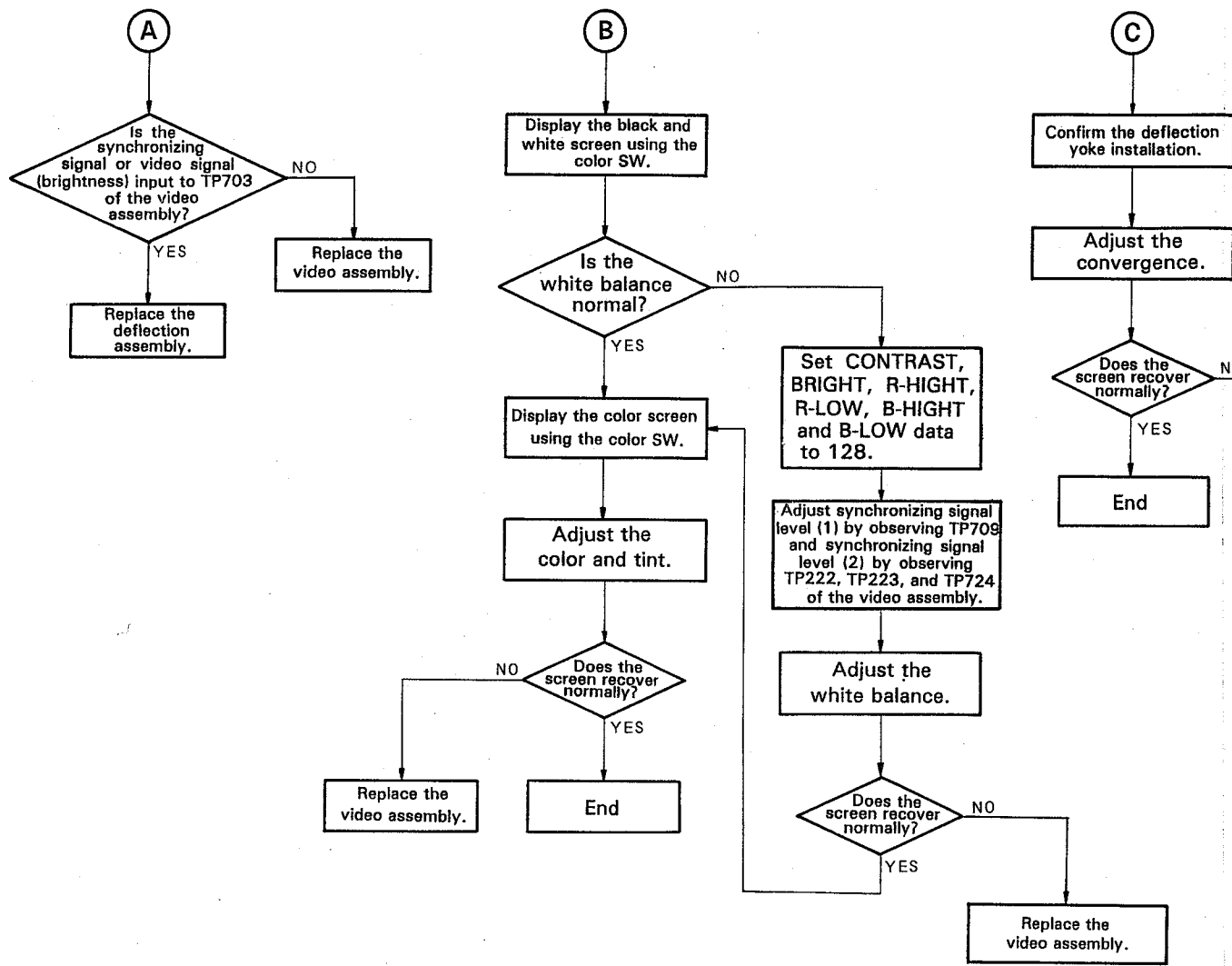


12. TROUBLE SHOOTING

• This troubleshooting chart assumes typical faults. Multiple assemblies or an assembly other than that shown may be defective depending on the fault. Disconnection of connectors is also conceivable.



\*1 High voltage generation can be detected from the sound produced by the assembly.



## 13. CIRCUIT DESCRIPTION

### 13.1 Peripheral light intensity correction circuit

In a projection display, the luminosity of the peripheral area of the image frame may be inferior to that at the frame center, depending on the characteristics of the optical components such as lenses and screen. When the projection unit is assembled and used as a system, the peripheral area of each frame is positioned at the central portion of the frame as a whole and this becomes a major factor behind the deterioration of image quality (See Fig. 13-1).

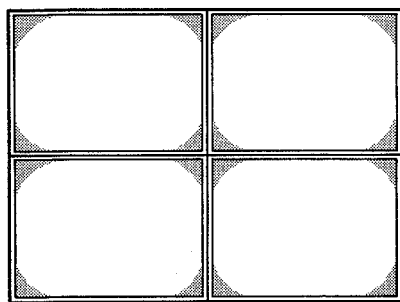


Fig. 13-1 Deterioration of peripheral light intensity of projection unit (In case of 4 units system)

The peripheral light intensity correction circuit acts to rectify such deterioration in image quality; it improves the brightness of peripheral areas by overlapping onto image signals of each color (red, green, blue) the parabolic waves of V cycle and H cycle from the convergence amplifier. (See Fig 13-2.)

When a waveform corrected for a bright image is used on a dark image, the peripheral area of the dark image becomes brighter than the central portion. For this reason, APL signals are detected and the gain of the correction waveform is controlled so that the degree of correction is varied in accordance with the brightness of the image as a whole and a natural image is thus obtained.

Moreover, there is a slight difference in color between the right and left sides of the image due to the arrangement of each cathode ray tube of red, green and blue with respect to the horizontal plane. In order to correct this difference, a sawtooth wave is added to the parabolic wave, and these are added in reverse polarity to the red and blue video signals for correction.

To confirm operation of the peripheral light intensity correction circuit, turn the MULTI switch at the rear panel to ON and confirm that the four corners of each projection unit are bright.

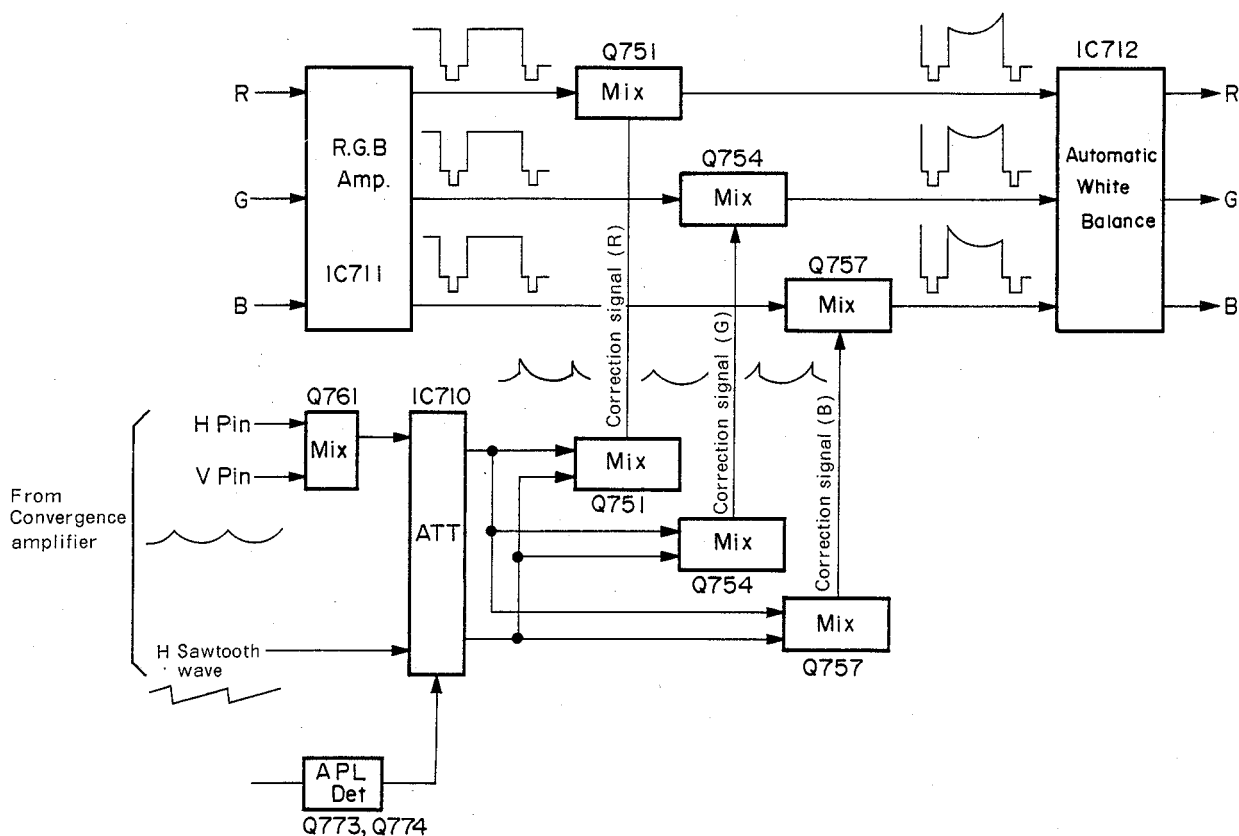


Fig. 13-2 Block Diagram of peripheral Light Intensity Correction Circuit

## 13.2 POWER-OFF CIRCUIT

This device is equipped with various types of protective circuits. These protective circuits operate to set the relay serving as the power switch to OFF, turning the system power off. If the power is turned off immediately after it is turned on, there is a possibility that the protective circuit is operating.

When the protective circuit operates, the thyristor consisting of Q101 and Q102 disables the power turned on if the power switch is turned on. To check this symptom, disconnect the power plug from the outlet, and connect the power plug after 15 to 20seconds or more.

### • Protective circuit type and operation

#### 1. X-ray protective circuit

When the CRT anode voltage exceeds the normal voltage, a maximum of 31.5kV, there is a possibility that the CRT will radiate X-rays. If the anode voltage is excessively high, the X-ray protective circuit detects the abnormality to turn the relay (RY101) off. To detect this abnormality, the output voltage of the dedicated windings (terminal No.3 and No.4) installed in the FBT (T301) generating the anode voltage is checked by the differential amplifier consisting of Q335 and Q336.

When the Q102 base voltage reaches about 0.6 to 0.7V, Q102 is activated to turn off Q103 driving the power switch relay (RY101). The working point of the X-ray protective circuit is preset to the proper value by VR306 before the deflection assembly is delivered.

#### 2. +135V power detecting circuit

This circuit detects an overcurrent in the 135V power line. If the overcurrent flows to drop the voltage to approximately 110V or less, Q109 and Q102 are turned on. When Q109 and Q102 are turned on, Q103 is turned off to cause the relay (RY101) to be turned off. In this state, the thyristor consisting of Q101 and Q102 can cause the relay to be turned on only if 15 to 20seconds or more passes after the AC plug is disconnected from the outlet.

#### 3. CRT heater voltage detecting circuit

Since an increase in the CRT heater voltage decreases the CRT life, Q115 and D134 stabilize the voltage at 6.3V. If the voltage is increased, Q116 and D136 detect the potential difference between Q115 collector and emitter, and output the result to the same line as for the X-ray protective circuit output.

#### 4. Current detecting circuit in the convergence yoke driving circuit

This circuit prevents abnormal heat generation of resistors R916, R917, R953 to R958 when the convergence yoke driving IC905 or IC906 is defective causing an abnormal current.

The abnormal current increases the voltages at both ends of resistor R916 for the minus power supply and at resistor R917 for the plus power supply. When the double-end voltage reaches approximately 7V or more, Q901 for the plus power supply and Q902 for the minus power supply are activated to turn Q901 on. When Q901 is turned on, the +23V voltage is output through D902 and R903 to the same line as for the X-ray protective circuit output.

#### 5. CRT damage prevention circuit

When the vertical deflection circuit does not operate, each R.G.B. CRT assembly is damaged. To prevent being damaged, the R315 double-end voltage is detected by Q307. If there is no potential difference between both ends of R315, Q307 is turned off, so that the collector voltage is output through D307 to the same line as for the X-ray protective circuit output.

#### 6. Relay (RY102) ON detecting circuit

In this device, resistors (R111 and R113) are mounted on the primary side of the switching regulator. These resistors are used to suppress the surge current when the power is turned on.

After the power is turned on, the relay (RY102) is turned on to short the resistors (R111 and R113). If the relay cannot be turned on, there is a possibility that abnormal heat is generated in the resistors or that this device operates abnormally. If the relay cannot be turned on, IC104 detects the potential difference between both ends of each resistor. When a potential difference is detected, a plus voltage (about 12V) is output to pin No.4 of IC104 and further output through R116, R105, and D107 to the same line as for the +135V power supply detecting circuit output. These operations cause the power to be turned off in the same way as in the other protective circuits.

## 14. SPECIFICATIONS

Type .....	40" Projection Unit
TV System .....	NTSC
Projection tube .....	7"CRT x 3
Horizontal resolution .....	800 lines or more
Luminance (at white peak) .....	600 ft-L
Usable field of view .....	150° (horizontal) 60° (vertical)

Input signals:

Input signals:

Video input..... Standard input level  
(75  $\Omega$ ) 1 Vp-p  
Input terminal: BNC connector x 1

Y/C separate input..... Standard input level  
(75  $\Omega$ )  
Luminance (Y) signal: 1 Vp-p  
Chrominance (C) signal: 286 mVp-p  
(burst signal)  
Input terminal: BNC connector  
(one each, Y and C)

RGB input ..... Analog R, G, B signals  
D SUB 9-pin connector x 1  
R, G, B signal 0.7 Vp-p (75  $\Omega$ )  
Composite sync signal 0.3 - 2 Vp-p (75  $\Omega$ )

Ext. control signal input..... Use to select  
VIDEO or Y/C signal as input.

TTL level input: ..... High: video input  
Low: Y/C separate input

Input terminal..... BNC connector x 1

Computer control:

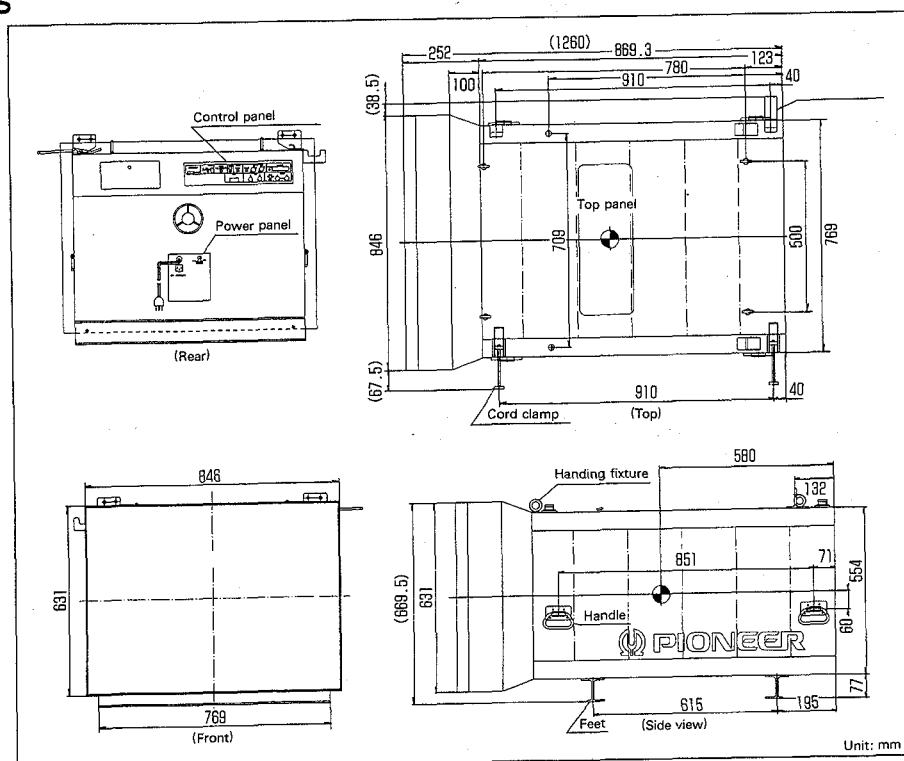
Computer control:	RS-232C
System.....	
Speed.....	Selectable 1200, 2400, 4800, 9600 baud
Electrical Requirements .....	100/120 V AC, 50/60 Hz
Power consumption.....	275 W (400 VA)
AC outlet (Max. 8 A, 800 VA) .....	1
Dimensions.....	846(W) x 670(H) x 1260(D) mm (33-1/4" x 26-3/8" x 49-5/8") (excluding protruding parts)
Weight.....	.85 kg (main unit)
Screen size .....	836(W) x 621 (H) mm
Accessories	
Wire clamps.....	4 sets
*Control cable .....	1
Operation manual (booklet).....	1
Warranty .....	1

*Note: A control cable is supplied for controlling multiple projection units being used together.*

NOTE:

**NOTE:**  
The specifications and design of this product are subject to change without notice, due to improvements.

## DIMENSIONS





## 15. HANDLING PRECAUTIONS

- **AVOID MAGNETIC FIELDS**

Large-size projection units are extremely susceptible to magnetic fields. In order to produce the optimum Hi-Fi picture, avoid installing the unit near iron objects, massed cables, or other articles which may emit a magnetic field.

Large speaker systems also produce large magnetic fields and should be avoided when installing this unit. Magnetic fields may disrupt the color tone or produce an unstable picture. When installing this unit near a speaker system which is not magnetically shielded, be sure to leave at least 1 meter on all sides between the projection unit and speaker system.

- **MOISTURE CONDENSATION**

Moisture condensation may be a particular problem in the winter months. If this unit is installed in a room which is allowed to become cold and then is heated suddenly (e.g. early in the morning), condensation may form on the screen and lens. To avoid this, let the unit stand for one hour before turning on the power or raise the room temperature gradually.

- **PROVIDE GOOD VENTILATION**

This projection unit is provided with a fan in the rear panel in order to prevent abnormal rises in internal temperature. Be sure not to block the ventilation holes when installing or using the unit.

- **IN CASE OF MALFUNCTION**

In the event of abnormal noise, smell, or smoke, disconnect the power cord from the wall electrical outlet, and have the unit inspected or repaired by your Pioneer service dealer or the store where you purchased the unit.

- **DO NOT DISASSEMBLE**

Do not open or remove the rear panel or front screen. You may receive personal injury from high-voltage circuits inside the unit. When internal inspection, cleaning or adjustments are required, contact your Pioneer service dealer or the store where you purchased the unit.

- **IF A FOREIGN OBJECT IS DROPPED INSIDE THE UNIT**

Fire danger or malfunction may result if miscellaneous objects (pins, coins etc.) are dropped through the ventilation holes of the projection unit. If this occurs, disconnect the power cord from your wall outlet and contact your Pioneer service dealer or the store where you purchased the unit.

- **DURING TRIPS, ETC.**

When you plan not to use the projection unit for an extended period of time, disconnect the power cord from your wall outlet.

- **NO WATER, PLEASE!**

Do not set flower vases, fishbowls, cups or other containers with liquid on top of the unit. If water or liquid is spilled inside the projection unit, immediately disconnect the power cord from your wall outlet and call your Pioneer service dealer or the store where you purchased the unit.

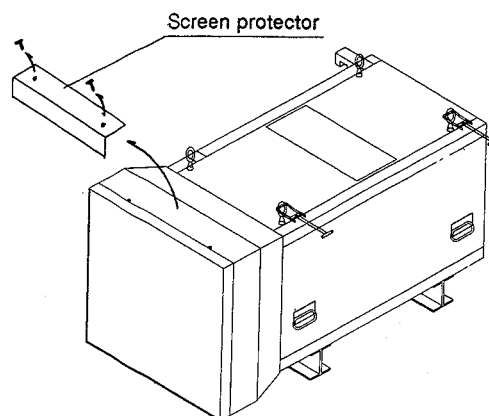
- **CLEANING THE SCREEN**

Dirt may easily collect on the surface of the screen. Occasionally clean it by wiping gently with a soft cloth. For heavier dirt, use a cloth which has been dipped in diluted neutral detergent and wrung out well. Then wipe dry with a soft, dry cloth. The screen can be scratched easily, and care should be taken to avoid scraping it with hard objects. Whenever cleaning the screen, be sure to first disconnect the power cord from your wall outlet.

### \*Screen Protector for Transport

A screen protector is attached to this unit to prevent the screen from falling off during shipping or transportation. Before using this unit, remove the screen protector by unscrewing the two screws from the unit. After removing the screen protector, replace the two screws.

Be sure to reattach the screen protector before shipping or transporting the unit.



## 16. BEFORE OPERATING THIS UNIT

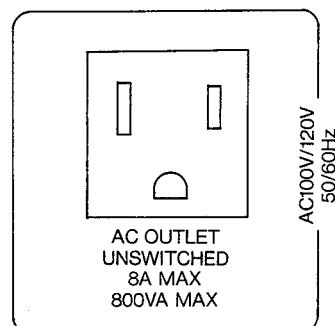
### AC OUTLET

#### AC Outlet (Unswitched, Max. 8 A)

Use this outlet to connect components with a total combined current not exceeding 8 A.

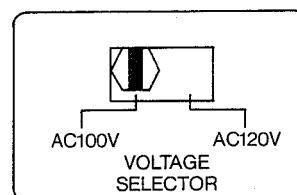
#### Power consumption of AC outlet:

Never connect any appliance which has a current rating (in amperes) exceeding that listed on the AC outlet. Damage to the projection unit or fire hazard may result.

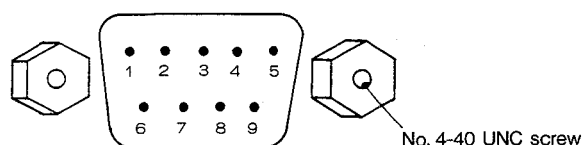


### VOLTAGE SELECTOR

This unit can be switched to accept a power supply of either 100 V or 120 V. Be sure to set this switch to 120 V for use in the U.S. or Canada.



## RGB INPUT TERMINAL



ANALOG RGB: 0.7Vp-p at 75Ω (0.88Vp-p max.).

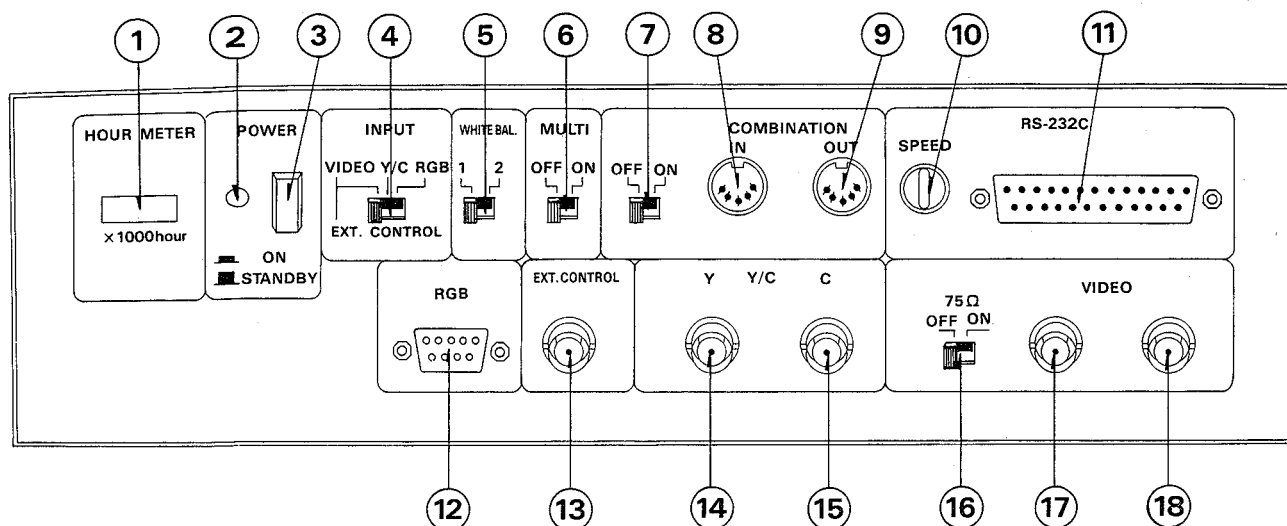
Sync: 1Vp-p at 75Ω.

Connector: 9-pin D SUB connector (male)

Pin assignment:

- 1: R
- 2: G
- 3: B
- 4: Signal GND
- 5: SYNC
- 6: GND
- 7: NC
- 8: NC
- 9: NC

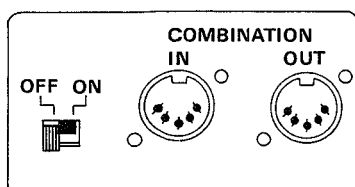
## 17. NAMES AND FUNCTIONS OF PARTS



No.	Name	Type	Description
①	Transmission Meter	Cumulative Transmission Time Meter	Displays cumulative transmission time. 1 mark = 1000 hrs. Full scale = 10,000 hrs.
②	Power indicator	Green LED	Indicates whether the power is ON or OFF.
③	Power switch	Push switch	
④	Input select switch	Sliding switch	Use to select VIDEO, Y/C or RGB signal as input. In the VIDEO position it is possible to select VIDEO or Y/C input using external control signal No. 13.
⑤	White balance	Sliding switch	Use to select color temperatures. The factory setting is "1" for normal use, "2" for retakes.
⑥	Multi switch	Sliding switch	Set to ON when using multi-pictures
⑦	Combination switch	Sliding switch	Used to turn the combination function ON/OFF.
⑧	Combination input terminal	DIN connector (5-pin)	Terminal for starting combination function of ABL, power and inputting to the RS-232C port.
⑨	Combination output terminal	DIN connector (5-pin)	Terminal for starting combination function of ABL, power and outputting from the RS-232C port.
⑩	Speed switch	Rotary switch	Used to set transmission rate for RS-232C.
⑪	RS-232C port	D SUB connector (25-pin female)	Connector used for RS-232C communications.
⑫	RGB input terminal	D SUB (9-pin male)	Used for inputting RGB signal.
⑬	Control input terminal	BNC connector	Used for inputting control signal for external selection of VIDEO input or Y/C input.
⑭	Y (luminance) input terminal	BNC connector	Used for inputting luminance signal.
⑮	C (chrominance) input terminal	BNC connector	Used for inputting chrominance signal.
⑯	Termination switch	Slide switch	Used to terminate VIDEO input terminal 18 in 75 ohms.
⑰	VIDEO output terminal	BNC connector	Used for outputting the VIDEO signal input from terminal 18.
⑱	VIDEO input terminal	BNC connector	Used for inputting a VIDEO signal.

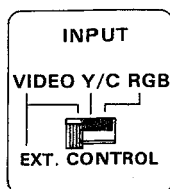
## 18. REAR PANEL MODE SELECTOR

### ● COMBINATION Switch



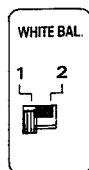
POSITION	FUNCTION
<b>ON</b>	ABL and power switch combination is enabled.
<b>OFF</b>	ABL and power switch combination is turned off.

### ● INPUT Selector



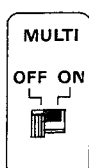
POSITION	FUNCTION
<b>VIDEO EXT. CONTROL</b>	Set to this position to select a VIDEO signal for input or when performing external control. Switching between VIDEO or Y/C input systems is performed by the control signal input to the EXT. CONTROL input terminal (BNC). Control signal High: VIDEO Low: Y/C When the control input terminal is left open (normal condition), the "High" condition results and the VIDEO input signal is selected.
<b>Y/C</b>	Set to this position to select a Y/C signal for input.
<b>RGB</b>	Set to this position to select an RGB signal for input.

### ● WHITE BALANCE SWITCH



POSITION	FUNCTION
<b>1</b>	Color temperature setting for normal use.
<b>2</b>	Color temperature setting for retake.

### ● MULTI SWITCH



POSITION	FUNCTION
<b>OFF</b>	Optimum picture quality setting for one screen.
<b>ON</b>	Optimum picture quality setting for multi screens.